November 9, 1929 *A McGraw-Hill Publication* 20 Cents per Copy

AVIATION

The Oldest American Aeronautical Magazine

TACOMA PUBLIC LIBRARY

HOW THE *Air Tour* WAS WON

By John H. Livingston

THE *Fokker F32* TRANSPORT MONOPLANE

MAKING *Airports* PAY THEIR WAY

There is one part of an aircraft engine upon which the whole industry agrees. That is the Bohn Ring True Bearing. 95% of all the bearings used for aeroplane engines are the Bohn Ring True product.

Pilots and designers know that this product is built by specialists who know how to purchase raw materials—understand the scientific handling of the various heats, and have a precise knowledge of alloys.

The Bohn Ring True Bearing is a safe bearing. Daily it is protecting the lives of thousands of flyers.

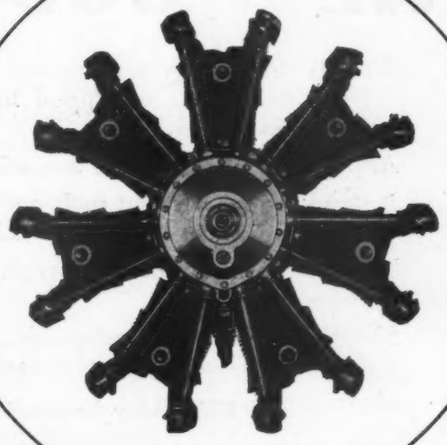
Aircraft Division
BOHN ALUMINUM & BRASS CORP., DETROIT, MICH.
New York Chicago Philadelphia Cleveland Pittsburgh

AVIATION, Nov. 9, 1929. Vol. No. 27, No. 19. Published weekly. McGraw-Hill Publishing Company, Inc., Tenth Avenue at 36th Street, New York, N. Y. Domestic $4.00 per year, Canada $5.00. All other countries $6.00; 20 cents a copy. Entered as second-class matter July 27, 1928, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

BUILT UNDER ONE ROOF

The ARGO
DEPARTMENT OF COMMERCE CERTIFICATE NUMBER 178

The HESS-WARRIOR
DEPARTMENT OF COMMERCE CERTIFICATE NUMBER 24

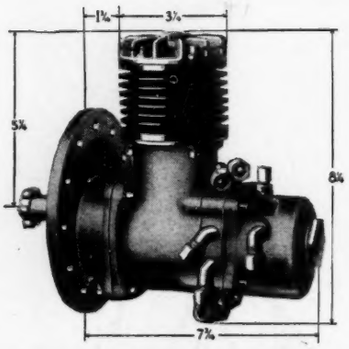


The ALLIANCE AIRCRAFT CORPORATION
MANUFACTURERS of AIRPLANES and AIRPLANE ENGINES
ALLIANCE, OHIO.

Wm B. STOUT

Uses the

HEYWOOD STARTER



START~ER
by
HEYWOOD

Wm. B. Stout, the aeronautical engineer of international reputation, has equipped his personal ship with a Heywood Starter.

Also the Stout Air Lines are using this advanced product.

It stands to reason that such authorities select their equipment with exact knowledge. They know the *facts*.

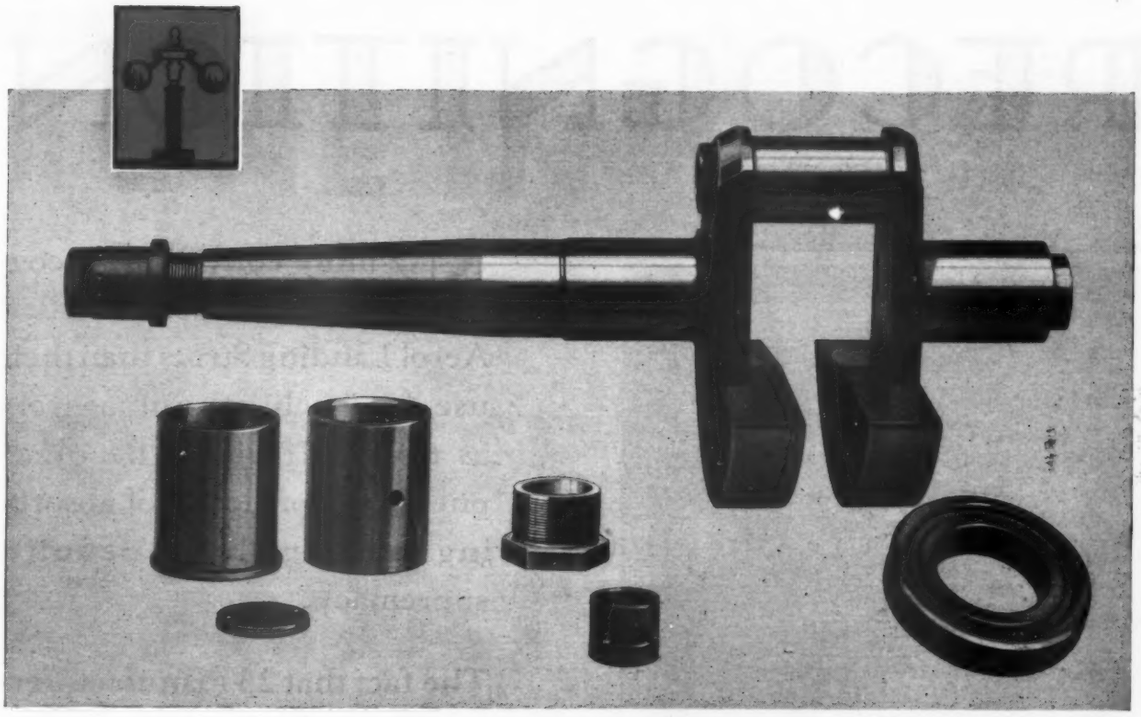
You too should get the facts regarding the compact, efficient Heywood Starter.

Simple in operation—adaptable to all standard engines—dependable—always start instantaneously—light in weight.

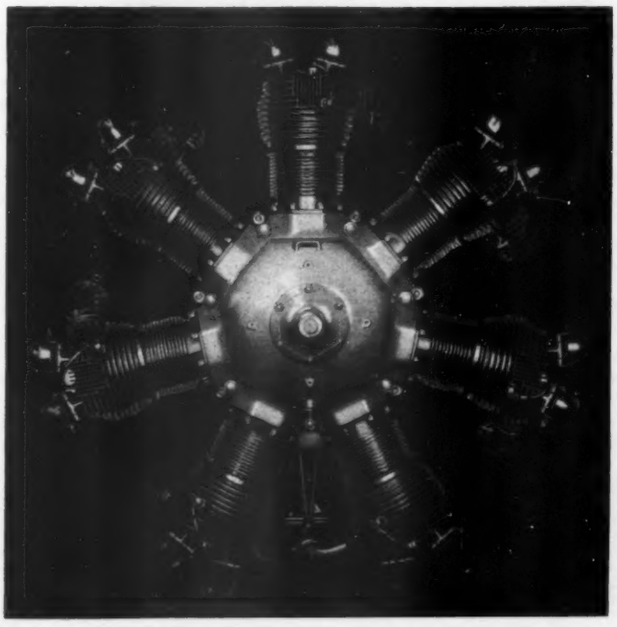
Write today for complete information

SKY SPECIALTIES CORPORATION, DETROIT
3651 Hart Avenue

HEYWOOD
STARTERS



BALANCED PERFECTION



The Crankshaft of the Axelson Engine is inherently a stabilizer. It is composed of two sections joined together by a male and female taper, which is hand-lapped to fit and secured by a dowel key. The Crankshaft is ground and finished to a perfect balance. It permits use of a solid one-piece crank spool to which the connecting rods are pivoted. Bearings are amply proportioned, the thrust being absorbed by a large, deep race ball bearing. All bearings are lubricated by a positive circulating system. The Crankshaft sections are forged from special nickel alloy steel, machined and ground to close tolerance.

Catalog now ready.

Axelson Aircraft Engine Co.

Factory and General Offices:
Corner Randolph St. and Boyle Ave., Los Angeles, California
(P. O. Box 337)

AXELSON AIRPLANE ENGINES

RECOGNITION

RYAN
WACO
EMSCO
LAIRD
MARTIN
FOKKER
BREESE
FERNIC
LUBLIN
LOENING
SPARTAN
GENERAL
SWALLOW
STEARMAN
HAMILTON
PITCAIRN
FLAMINGO
BELLANCA
SIKORSKY
TRAVEL AIR
GREAT LAKES
BERLINER-JOYCE
CUNNINGHAM-HALL

NO more convincing recognition could be accorded Aerol Landing Struts than their use by such manufacturers as these. It gives the oleo-pneumatic principle of absorbing landing shock definite supremacy.

The fact that 23 manufacturers have standardized (and that practically all others offer Aerol Struts as optional equipment) makes it possible for the entire operating end of the aircraft industry to enjoy a degree of landing comfort, safety and economy *that is not afforded by any other type of landing gear.*

Aerol Struts are manufactured at Cleveland by the Cleveland Pneumatic Tool Company.

Ask the Pilots Who Land On Them

AEROL shock absorbing STRUT

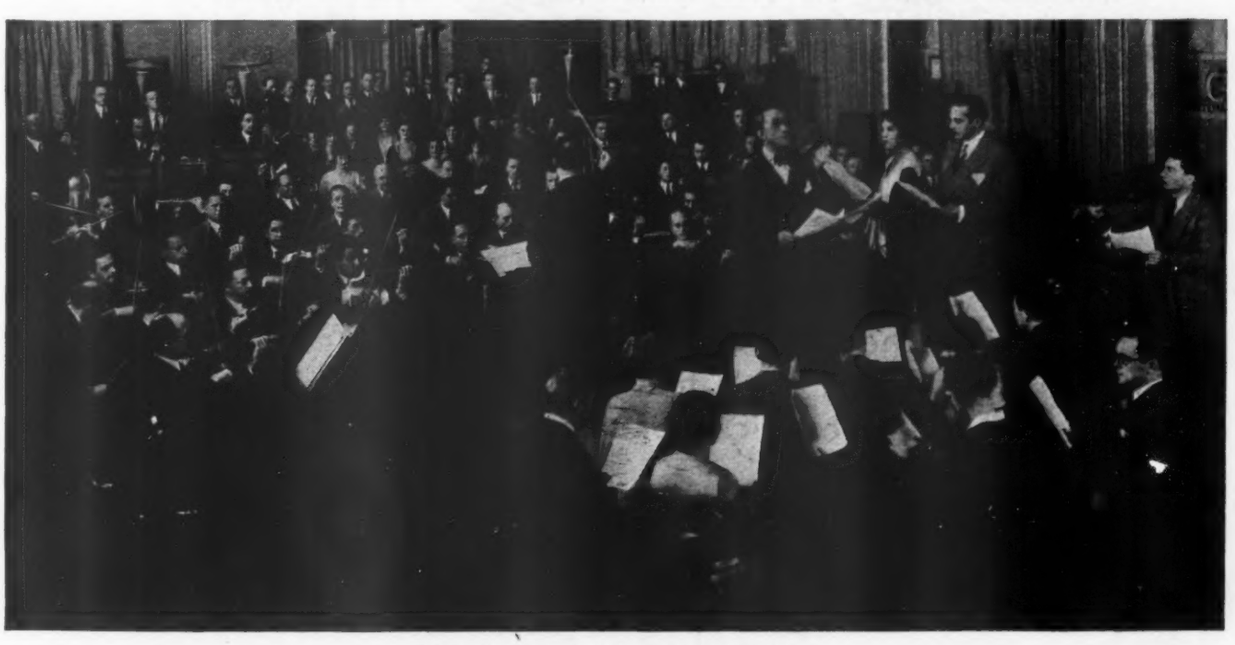
TUNE IN

AND HEAR THE

ROMANCE

OF AVIATION.....

WEDNESDAY, NOV. 13

Westinghouse invites you to tune in . . . 7:30 p. m., Eastern Standard time, for the "Westinghouse Salute" to Aviation, second in a series of radio programs of a new type . . . an orchestra of 50 pieces . . . a wordless chorus of 40 voices . . . full cast of actor-stars from the legitimate stage . . . through stations KDKA, WBZ, WBZA, KYW, and a coast-to-coast network of National Broadcasting Company stations with supplementary networks.

The Studio Cast of a "Westinghouse Salute"

Westinghouse

WESTINGHOUSE ELECTRIC

SALUTES THE AVIATION INDUSTRY

In every vocabulary of the air

this word
"CORSAIR"
conveys a wealth of meaning

FOR every word that finds its way into the specialized vocabulary of the air you'll find good reason. "Corsair," for example.

To everyone who flies or has flown military and naval ships "Corsair" means a ship with performance that quickly ripens admiration for the plane into genuine affection.

All around performance . . . speed, ease of handling; rapid climb and the ability to get into and out of small fields with heavy loads . . . that's the "Corsair."

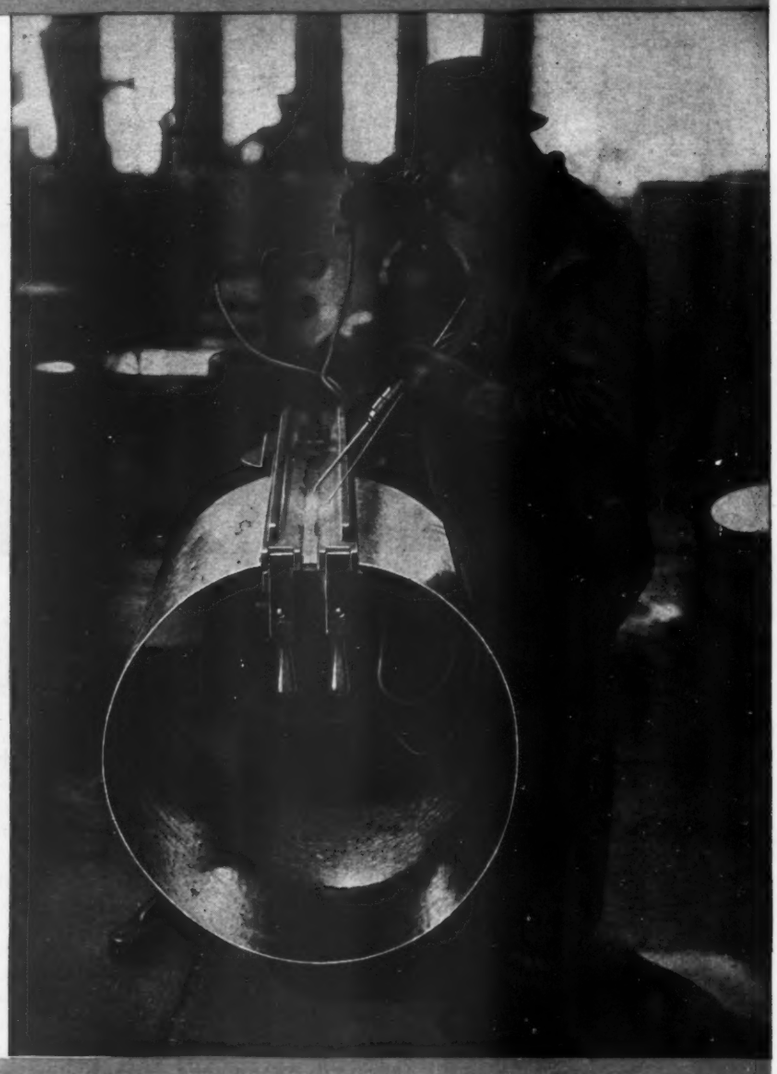
CHANCE VOUGHT CORPORATION

DIVISION OF UNITED AIRCRAFT & TRANSPORT CORPORATION

Long Island City, New York

DO IT BY OXWELDING

AS pioneers in every phase of oxy-acetylene welding and cutting, the thoroughly experienced engineering and service organizations of these companies can help you in the proper application of oxwelding to your present work and to new production activities.



Fulfilling every need for Oxwelding and Cutting.....

LINDE OXYGEN
The Linde Air Products Company

Prest-O-Lite
Dissolved Acetylene
The Prest-O-Lite Company, Inc.

Oxweld
Apparatus and Supplies
Oxweld Acetylene Company

UNION CARBIDE
Union Carbide Sales Company

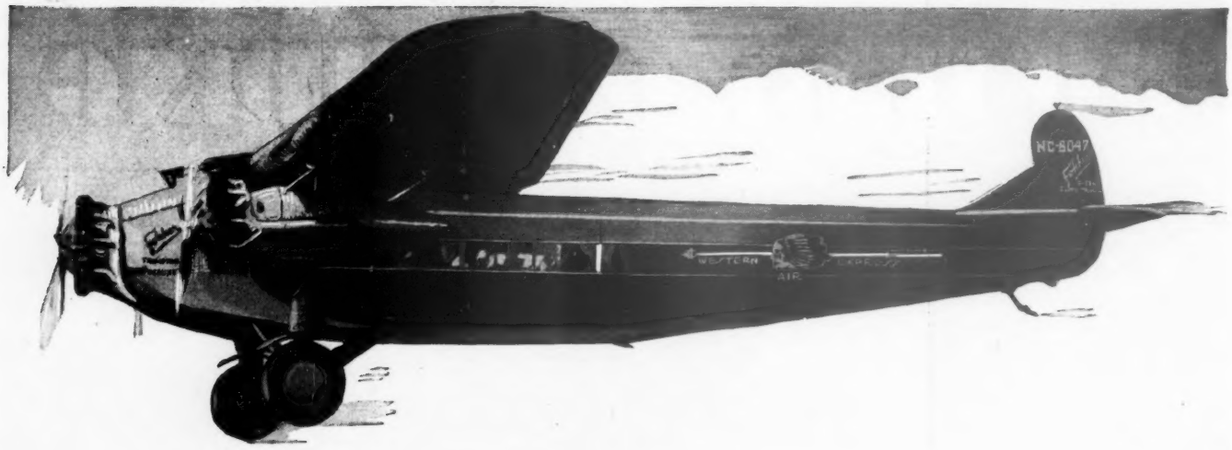
Units of
UNION CARBIDE AND CARBON CORPORATION

General offices
30 East 42nd Street
New York, N. Y.

UCC

Sales offices in
Principal cities
throughout the country

64 Linde plants—45 Prest-O-Lite plants—154 Oxygen Warehouse stocks—138 Acetylene Warehouse stocks—38 Apparatus Warehouse stocks—235 Carbide Warehouse stocks



The Old Mormon Trail

Salt Lake City to Los Angeles!

Country reminiscent of pioneer days . . . trekking covered wagons . . . pony express . . . cliff dwellers . . . Hopi and Navajo Indians, their mesas and pueblos . . . the wonderful, rugged, untamed West.

Mountain peaks . . . sunlit valleys . . . forests . . . prairies . . . lakes and streams . . . which once tried hardy travelers in their journey of months . . . are now a tonic to city-weary eyes, during the trip's few hours of pleasant relaxation.

Giant Fokker air liners, soaring serenely the Western Air Express route, span this area almost too quickly as they head for that earthly Paradise called California, with its gorgeous great blue background . . . the Pacific.

In the skilled hands of Western Air Express pilots, the speed, comfort, and dependability necessary for this travel is assured. The Fokker way of air travel saves days of valuable time . . . for business man and vacationist.

Fokker super tri-motor air liners are giving the same unwavering satisfaction on other commercial systems: Universal Aviation Corporation, Southern Air Transport, Pan-American Airways, Standard Air Lines, National Parks Airways, Dominion Airways, Western Canada Airways.

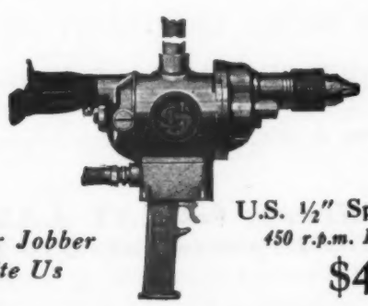
If interested in air travel, send a 5-cent stamp (to pay air mail postage), and we will send you our illustrated booklet, "When Air Travel Pays." Address the Fokker Travel Bureau, 23rd Floor, 292 Madison Ave., New York City, Room 2300.

FOKKER AIRCRAFT CORPORATION OF AMERICA

Factories: WHEELING, WEST VIRGINIA, *and* TETERBORO AIRPORT, HASBROUCK HEIGHTS, NEW JERSEY
Address inquiries: NEW YORK OFFICE, 1775 BROADWAY

"Speaking of Records for Endurance"

"WELL, sir, when it comes right down to long, hard r.p.m.s, you've got to doff the helmet to the good old U. S. Drills. In manufacturing planes and motors—or in servicing 'em—we've got to have drills that stand up. And U. S. Drills have had this reputation ever since the first electric drill in the world was brought out by U. S. over thirty years ago. They're *the good mechanic's choice* every time."



U.S. ½" Special Drill
450 r.p.m. Load Speed
$44

Ask Your Jobber or Write Us

THE STANDARD OF QUALITY SINCE 1897

Oldest Builders of Electric Drills and Grinders in the World.

THE UNITED STATES ELECTRICAL TOOL COMPANY

2466 West Sixth Street, CINCINNATI, OHIO, U. S. A.

Atlanta, Boston, Chicago, Cleveland, Dallas, Denver, Detroit, London, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco, Syracuse

Export Sales Representatives—WESTINGHOUSE ELECTRIC INTERNATIONAL CO.—150 Broadway, New York City

Canadian Division—MAPLE LEAF ELECTRIC TOOLS, Ltd.—Toronto

Wire or Write!

GREAT LAKES AIRCRAFT CORPORATION has developed a proven Operating-Sales Plan that now makes it possible for any capable individual or group to make money—*real money*—in the airplane business.

This unique plan is built around—

1. A line of ships of exceptional merit—approved by the Government—designed for the utmost in safety and efficiency—smart and saleable—up-to-the-minute in equipment—economical in operation—priced on a quantity-production basis.
2. A practical and effective plan of merchandising that insures profits both to distributor and dealer from the start—and also develops a lasting source of non-competitive business.
3. Constant and active co-operation of a highly capable sales promotion organization whose motto is: *"Sell ships by helping the distributor and dealer sell."*
4. Distributors and dealers who are business men with selling ability, energy and reasonable working capital.

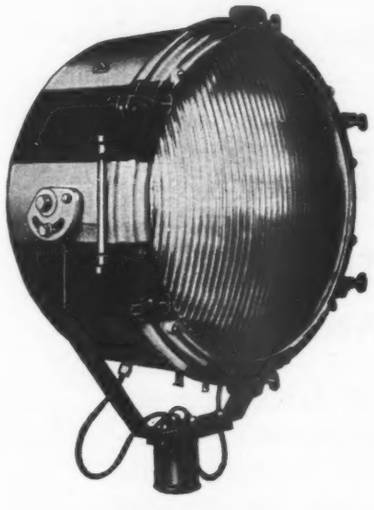
If you are earnestly seeking an opportunity to make money and establish yourself permanently in the airplane business, wire or write us today, outlining your sales or business experience and present connections.

There is still some valuable territory available for the right type of men

***Address:* GREAT LAKES AIRCRAFT CORP.**
***Sales Department:* 230 Park Avenue, New York City**

GREAT LAKES AIRCRAFT
CORPORATION CLEVELAND

Contractors to the United States Army and Navy



Type DCE24
Landing Field Floodlight

SAFE LANDINGS AT NIGHT

In order to put night flying on a profitable basis, it is absolutely necessary to provide adequate night lighting facilities. The landing field must be illuminated to a high enough intensity so that the pilot may land his plane with perfect ease and safety.

Type DCE24 is an ideal floodlight for lighting landing fields. This unit is particularly adapted for lighting large fields and fields of uneven contour and irregular shape.

Everything in lighting equipment for Airports and Airways

CROUSE-HINDS

SALES OFFICES
NEW YORK PHILADELPHIA
BOSTON DETROIT ATLANTA
PITTSBURGH SAN FRANCISCO

ESTABLISHED 1897
SYRACUSE, N. Y. U. S. A.

SALES OFFICES
CHICAGO CLEVELAND
MILWAUKEE ST. LOUIS CINCINNATI
MINNEAPOLIS LOS ANGELES

CONDULETS GROUNDULETS - PLUGS AND RECEPTACLES - FLOODLIGHTS - TRAFFIC SIGNALS
AIRPORT AND AIRWAY LIGHTING EQUIPMENT PANELBOARDS AND CABINETS - SWITCHES

C-H475

LOCKHEED-VEGA

THE WORLD'S FASTEST COMMERCIAL AIRPLANE!

It is a significant fact that the majority of Lockheed airplanes in service are used for transport purposes. Commercial airline owners know that Lockheeds operate at the lowest cost per passenger mile—and provide the greatest service to passengers in time saved.

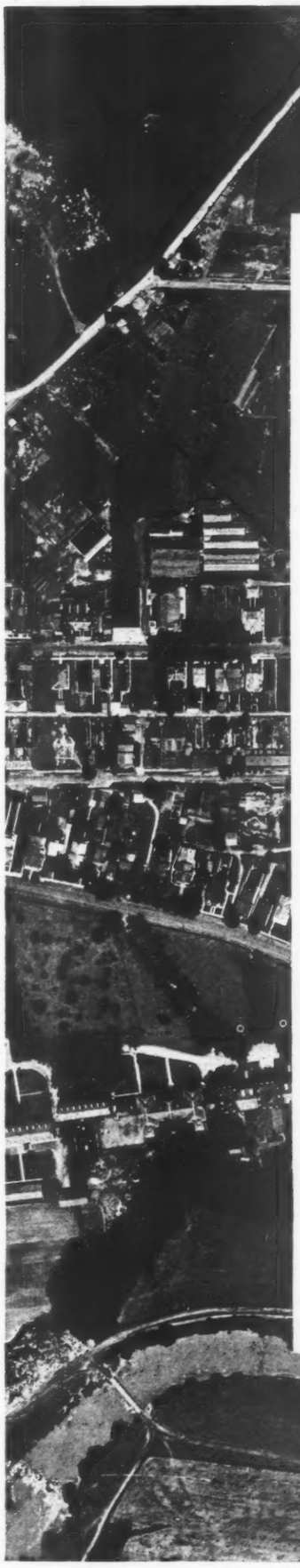
The Lockheed-Vega will be on display at the Western Aircraft Show, Los Angeles, Nov. 9th to 16th.

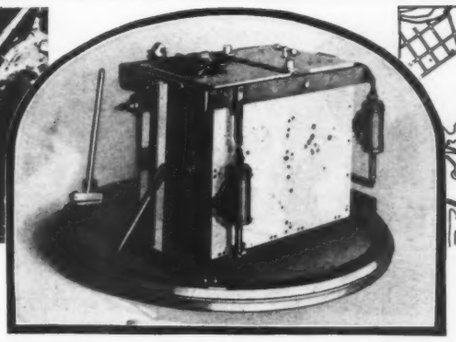
LOCKHEED
VEGA
LOS ANGELES U.S.A.

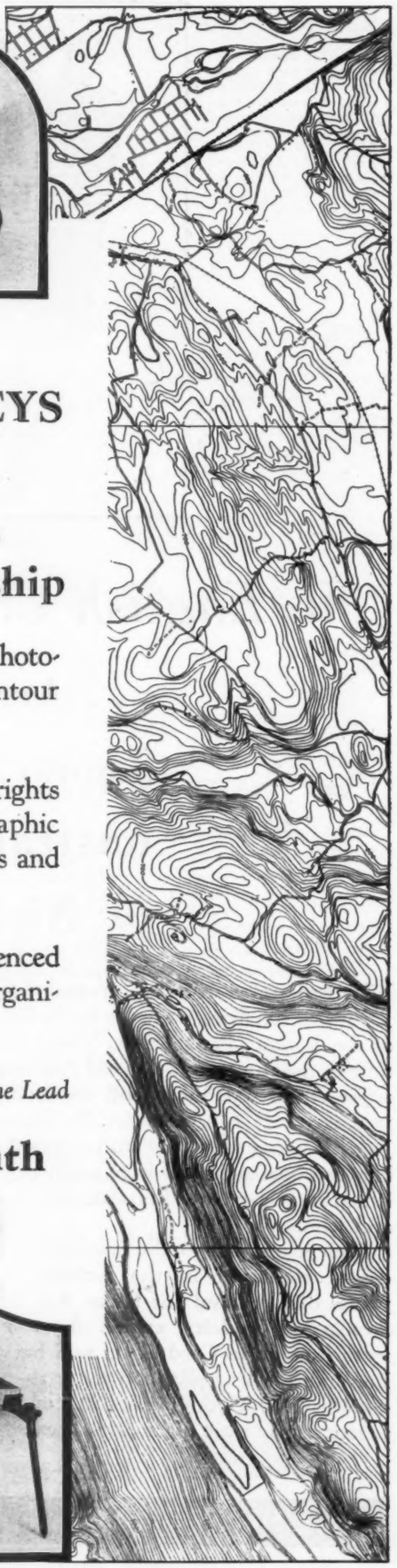
LOCKHEED AIRCRAFT CORPORATION . . . . Los Angeles, California

Division of

DETROIT AIRCRAFT CORPORATION . . . . Union Trust Building, Detroit







BROCK AERIAL SURVEYS

offer the advantages of pioneer leadership

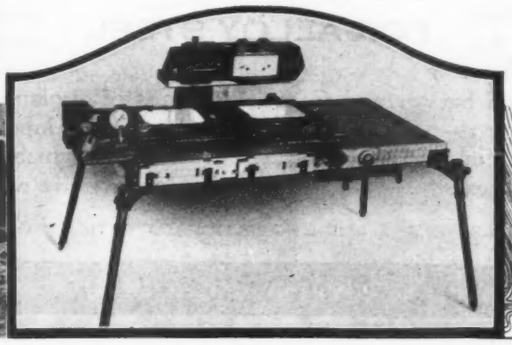
The most accurate photographs, mosaics, plan and contour maps.

The use of basic patent rights on aerial cameras, photographic mapping, many related devices and methods.

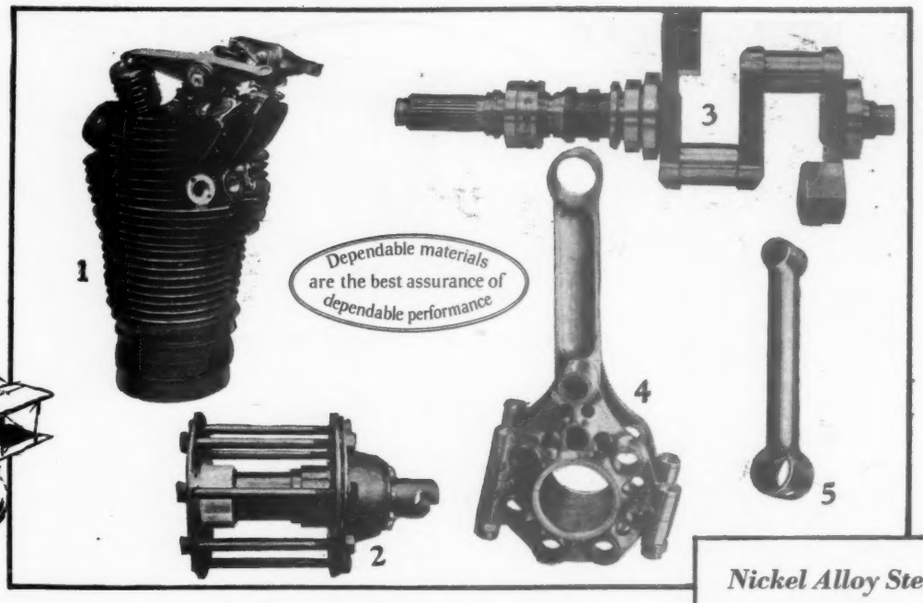
The service of an experienced engineering and air survey organization.

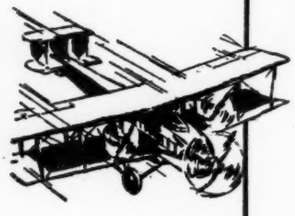
First in the Field *Far in the Lead*

Brock & Weymouth
INCORPORATED
1609 Walnut St., Philadelphia



Nickel Alloy Steel (1) cylinder (2) propeller hub (3) crankshaft (4) master rod and (5) connecting rod of Jaguar aero engine. Manufactured by ARMSTRONG SIDDELEY MOTORS, LTD., Coventry, England. This famous engine contains approximately 20 lbs. of Nickel.





In English Channel Service

. . . Armstrong Siddeley Jaguar Aero Engines demonstrate dependability of *Nickel Alloy Steels*

Nickel Alloy Steel parts in Jaguar Aero Engine

Cylinders
Crankshafts
Master rods
Link rods
Propeller shafts
Propeller hubs
Valve mechanism
Gudgeon pins
Art. rod pins
Tappet rollers
Reduction gears
Cam gears

FOR several years radial air-cooled Jaguar engines have been flying daily across the English Channel on the London-Paris airline. Today, the total flying time of the three triple-engined Argosy planes used is approaching 7,000 hours and the total distance covered is nearly 630,000 miles. In this severe service Jaguar engines have been run a period of 400 hours between overhauls and have established unusual records for reliability and economy.

The Jaguar is also the standard engine employed in the various planes of the Royal Air Force. An Armstrong Siddeley engine flew from London to Cape Town and back . . . and from England to Australia and return — a distance of 44,000 miles. Upon inspection the engine revealed practically no trace of excessive wear.

Nickel
FOR ALLOY STEEL

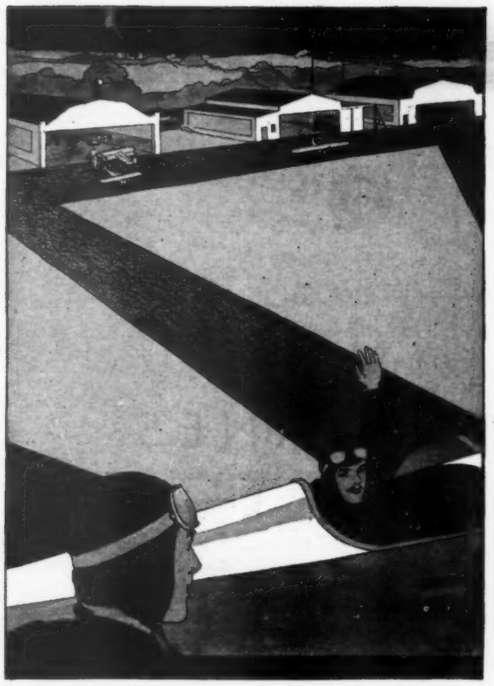
Nickel Alloy Steel is used for all highly stressed parts of the Jaguar engine. More than 20 lbs. of Nickel are used in making alloy steel for various parts. Under the most exacting flying conditions and in extremes of temperatures, Nickel Alloy Steel parts have demonstrated their unquestioned dependability.

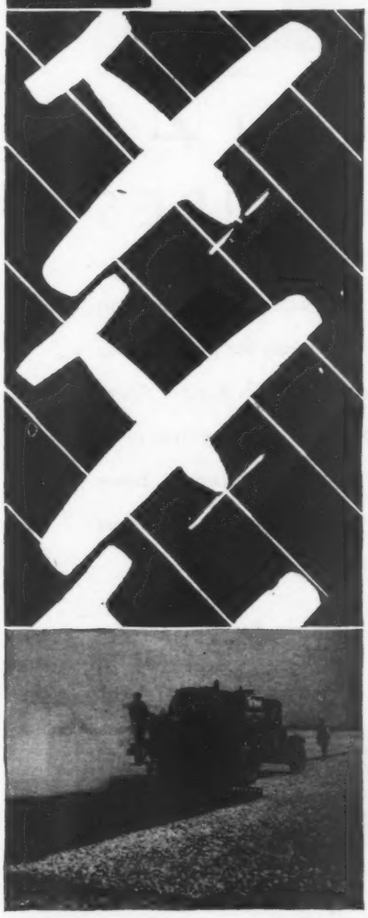
Extensive tests have demonstrated that the average, maximum and minimum values of Nickel Alloy Steels vary less from heat to heat than those of other alloy steels — that their mechanical properties are dependably uniform. This is but one of the reasons why practically all manufacturers of airplane engines, both in America and Europe, have adopted Nickel Alloy Steel for highly stressed parts which must have utmost dependability without excessive weight.

SEND FOR "BUYERS' GUIDE TO NICKEL ALLOY STEEL PRODUCTS"

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

"Happy Landings"





Applying Tarmac at Bettis Field, near Pittsburgh. Work being done by Stone & Webster for Curtiss Airports Corporation.

The customary goodbye to a pilot before he takes off—"*Happy Landings.*" Some of his landings are made on dust-clouded runways, some on soft muddy ones, some on turf that looks good but isn't. Many of his take-offs too, have to be bumpy, uneven, and alarming to timid passengers.

The president of an aviation corporation said in a recent magazine: "*Aviation will never find bigger profits in the air until it makes a better showing on the ground.*"

The American Tar Products Company is working with airport operators in many parts of the country to make runways and landing strips safe. It has produced an economical airport paving material—Tarmac—with resilient, non-rigid qualities that facilitate the take-off, and enable it to ease the impact of the landing plane. It is durable, long-lasting, dustless, smooth riding and skid-proof, wet or dry.

We will be glad to tell you how Tarmac can be used for all runways, landing strips, hangar aprons, and for roads leading to airports.

AMERICAN TAR PRODUCTS COMPANY

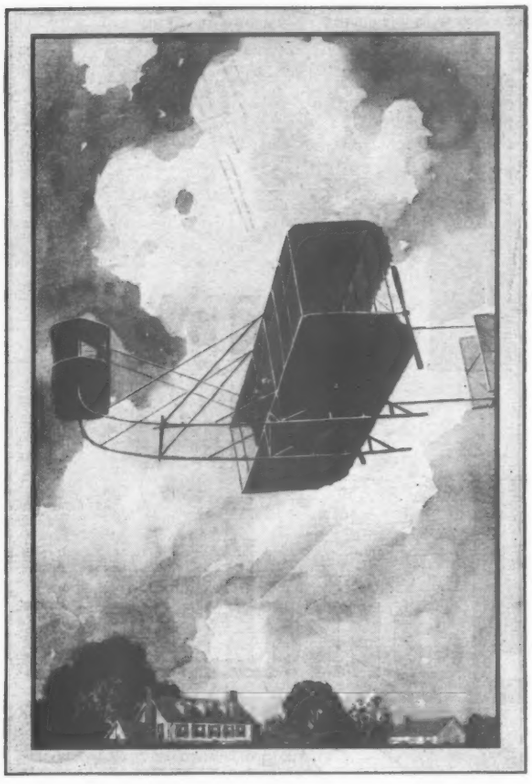
General Offices: KOPPERS BUILDING, PITTSBURGH, PA.
New England Division: TAR PRODUCTS CORPORATION, Providence, R. I.

PLANTS

Chicago, Ill.	Utica, N. Y.	Providence, R. I.	Follansbee, W. Va.
Milwaukee, Wis.	Birmingham, Ala.	Kearny, N. J.	St. Louis, Mo.
Youngstown, O.	Hamilton, O.	St. Paul, Minn.	New Haven, Conn.

Tarmac

FOR GOOD AIRPORT PAVING



MOST PLANES DIDN'T HAVE WHEELS

WHEN U. S. RUBBER BUILT THE FIRST PNEUMATIC AIRPLANE TIRES

When the United States Rubber Company first built pneumatic tires for aircraft, the landing gear for most planes consisted simply of two parallel skids of spruce or ash. Landing skids, however soon gave way to wheels and in 1908 both Orville Wright and Glen Curtiss equipped planes with 20" x 2" Hartford "Aviator" tires, built by the U. S. Rubber Company.

Larger and heavier tires soon followed and a 1910 U. S. advertising folder entitled "To Help You Fly" illustrates three sizes of pneumatic airplane tires as well as other aviation accessories.

Today—with 20 years of actual experience in building tires designed expressly for the exacting requirements of aircraft—the U. S. Rubber Company offers a complete line of airplane tires in all sizes with either plain or non-skid treads. Every tire is of the exclusive web-cord construction thus combining light weight with great strength.

Phone United States branches for fast service.

UNITED STATES RUBBER COMPANY

Stinson-Detroiter six-passenger cabin monoplane equipped with United States Airplane Tires

UNITED STATES
AIRPLANE
TIRES

AVIATION

The Oldest American Aeronautical Magazine

EDWARD P. WARNER, *Editor*
JAMES H. MCGRAW, JR., *Publishing Director*

R. SIDNEY BOWEN, JR., *Associate Editor*

LESLIE E. NEVILLE, *Technical Editor*
CHARLES H. GALE, *Assistant Editor*

HERBERT F. POWELL, *News Editor*
EARL D. OSBORN, *Contributing Editor*

CHARLES F. MCREYNOLDS, *Pacific Coast Editor*
JOHN T. NEVILL, *Detroit Editor*

CONTENTS

November 9, 1929

VOLUME 27 . . . NUMBER 19

Editorials 919

How the 1929 Air Tour was Won..... 922

The Fokker F32 Transport Monoplane.. 926

The Opel Rocket Plane..... 931

Making the Airport Pay for Itself..... 932

Showmanship in Scenic Air Tours..... 936

Legal Responsibilities of Carriers of Goods and Baggage by Air..... 938

The Western Aircraft Show 941

News Sections 944

The Buyers' Log Book 957

What Our Readers Say..... 958

Editorial Comment from the Daily Press 959

Abstracts and Reviews 960

McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th Street, New York, N. Y.

Cable Address: "Machinist, N. Y."

JAMES H. MCGRAW, Chairman of the Board
MALCOLM MUIR, President
JAMES H. MCGRAW, JR., Vice-Pres. and Treas.
EDWARD J. MEHREN, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
HAROLD W. MCGRAW, Vice-President
H. C. PARMELEE, Editorial Director
C. H. THOMPSON, Secretary

NEW YORK Dist. Office, 285 Madison Ave.
WASHINGTON, National Press Building
CHICAGO, 520 N. Michigan Ave.
PHILADELPHIA, 1600 Arch Street
CLEVELAND, Guardian Building
ST. LOUIS, Bell Telephone Building
SAN FRANCISCO, 883 Mission Street
BOSTON, 1427 Statler Bldg.
GREENVILLE, S. C., 1301 Woodside Building
DETROIT, 4-257 General Motors Bldg.
LONDON, 6 Bouverie St., London, E. C. 4

Copyright, 1929, by McGraw-Hill Publishing Company, Inc.
Member A.B.C.

SCINTILLA

AIRCRAFT MAGNETOS

Are Selected Because of Their

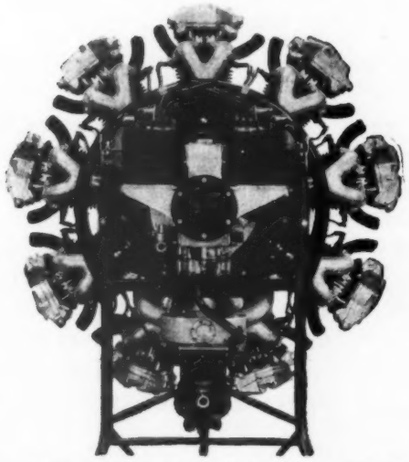
DEPENDABILITY
SIMPLICITY
ACCESSIBILITY

Scintilla Aircraft Magnetos can be obtained for engines of from one to eighteen cylinders.

Scintilla Aircraft Magnetos are Standard Equipment on Aircraft Engines Built by

Aero Development Co.
Aeromarine Plane & Motor Co.
Aeronautical Products Corp.
Aircraft Holding Corp.
Airman Engineering Co.
Alliance Aircraft Corp.
American Cirrus Engines, Inc.
Axelson Aircraft Engine Co.
Brownback Motor Laboratories, Inc.
Century Rotary Motor Corp.
Comet Engine Corp.
Continental Motors Corp.
Cross Gear & Engine Co.
Curtiss Aeroplane & Motor Co.
Fairchild Airplane Mfg. Corp.
Fischer & Jacobs, Inc.
General Airmotors Company
Hurricane Motor Co., Inc.
Kinner Airplane & Motor Co.
Lambert Aircraft Engine Corp. (Formerly Velie Motors Corp.)
Light Mfg. & Fdry. Co.
Lycoming Mfg. Co.
MacClatchie Mfg. Co.
Marchetti Motor Patents, Inc.
Menasco Motors Company
Michigan Aero-Engine Corp.
National Aero Corp.
Packard Motor Car Co.
Quick Air Motors Co.
Rocky Mt. Steel Products, Inc.
Spartan Aircraft Co.
Szekely Aircraft and Engine Company.
The Kimball Aircraft Corp.
The Le Blond Aircraft Engine Corp.
The Pratt & Whitney Aircraft Co.
Tips and Smith, Inc.
Warner Aircraft Corp.
Western Enterprise Corp.
Wright Aeronautical Corp.
Wright-Tuttle Aircraft Motors Corp.

One of a number of American Aircraft Engines equipped with Scintilla Aircraft Magnetos



Aeromarine Radial Air-Cooled Engine, "B" Type, Manufactured by Aeromarine Plane & Motor Corp.

SCINTILLA PARTS DEALER SERVICE STATIONS

CHICAGO, ILL.
Illinois Auto Electric Co.
2450 Calumet Ave.

DETROIT, MICH.
Greenleaf, Inc.
3127 East Jefferson Ave.

LOS ANGELES, CALIF.
Pacific Airmotive Corp.
3417 Angeles Mesa Drive

NEW YORK CITY
Manhattan Ignition Corp.
206 W. 68th Street

PHILADELPHIA, PA.
J. W. Parkin, Jr., Ignition Specialist
2251 N. Broad St.

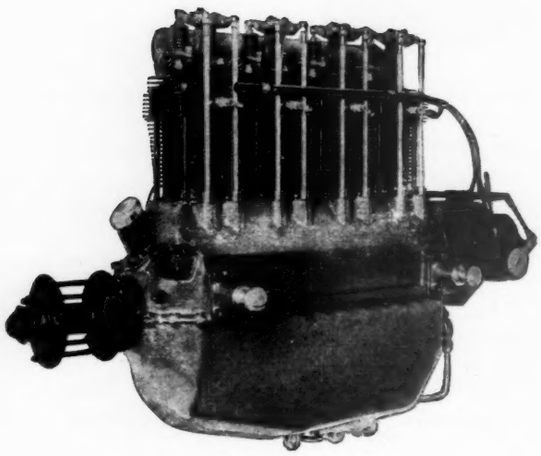
TULSA, OKLA.
Magneto Ignition Corp.
304 E. Second Street

W. PALM BEACH, FLA.
Sutcliffe's Automotive Electrical Service Co.
Corner First and Olive Sts.

SCINTILLA MAGNETO CO. INC.
SIDNEY - NEW YORK
Contractors to the U.S. Army and Navy

TACOMA PUBLIC LIBRARY

Specialization . . . [redacted]



Wright Gypsy Motor

Cheney Cast Cylinder barrel used in the Wright Gypsy.

Well organized manufacturing calls for specialized knowledge in the production of parts of the product manufactured.

The casting of the airplane motor cylinder is a highly specialized undertaking not only in casting methods but also in metallurgic research.

Cheney Cast Cylinders are made of properly alloyed nickel-iron having a finer grain, a uniform and improved hardness, free from carbide hard spots. We can furnish castings in the rough, or machined cylinders ready for assembly, direct from your blue prints.

Our twenty-five years' experience in the making of air-cooled cylinders is available to any responsible motor manufacturer.

AIR COOLED CYLINDERS

S. Cheney and Son

MANLIUS, N.Y.

CHENEY ~ CAST ~ CYLINDERS

High Strength ~ Low Cost

AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McGRAW-HILL PUBLICATION . . . ESTABLISHED 1916

EDWARD P. WARNER, *Editor*

VOLUME 27 . . . *November 9, 1929* . . . NUMBER 19

An Anxious Look at a Closed Door

ALL IS QUIET along the Potomac. The air mail operators are meeting in secluded conference with the Postmaster General and his representatives, and no authentic version of their deliberation issues forth. The aeronautical community waits anxiously upon the result, from which much depends. The future course of development of air transport will be governed laregly by the decisions now being reached in the Post Office Department.

Some definite announcement may have been made before this editorial reaches our readers, and when it comes it may make any expression of uneasiness now look quite ridiculous. In the meantime, however, we cannot help being somewhat disturbed at the very length of the negotiations, at the seeming difficulty of reaching an understanding upon the fundamental method of compensation. Although it is important that rates should be fair and that all the operators should be adequately paid for their work, it will be even more vital in the long run that a sound basic principle shall be adopted.

We have briefly expressed our own views on a previous occasion. A growing anxiety leads us now to enlarge upon them. We are firmly convinced of the extreme unwisdom of any system of payment which penalizes efficiency either in operation or in traffic solicitation. We are convinced of the inadvisability of any plan basically paternal, or of any one which involves governmental supervision of the contractor's accounts, or makes payment dependent upon the magnitude of his profits or losses. The payment made to an air mail contractor on a domestic route should depend on only one thing—the service rendered.

If an air mail contract does not prove profitable to the carrier at a reasonable rate per pound carried per mile, it is either because the operations are inefficiently or uneconomically conducted, or because not enough mail is being secured. In the latter event, one or more of three factors must be at work. Either the work of traffic solicitation and development is being badly done, or it has not had time to become effective upon a new route, or the traffic simply is not there to be developed. In the first case the operating company which has fallen down on the job of selling its service is entitled to no sympathy. If it falls down badly enough and persistently enough, it should make way for someone who will be more successful in attracting public attention and support. In the second instance patience, courage, and hard work are needed. The service which pays in the first months of operation is a distinguished exception to the general rule. Fortunately mergers and new issues of capital have put the operating companies in a position to carry over the development period into the profit-making stage. There remains the third possibility. If the traffic does not exist, the lines should not exist either. The service should be given up, and the effort expended elsewhere where it is more badly needed by the populace.

There has been no evidence of an intention on the part of the administration arbitrarily to cut rates until the air mail deficit is extinguished, and we are unwilling to believe that any such notion is entertained. The air mail is certainly on the way to a completely self-sustaining status, but to expect it to cover the whole distance at a single bound at the first readjustment of rates would be unjust and absurd. It will be in the interest of progress toward complete self-support if the companies which have been pathfinders in traffic development and in improving operating efficiency are allowed to make proportionately larger returns. The compensation of the carrier should depend primarily upon the amount of mail carried, and only in a very secondary degree upon the distance flown. The operator who carries five hundred pounds of mail on each trip over a three-hundred-mile route may not be entitled to five times as much payment monthly as one who handles only one hundred pounds on

TACOMA PUBLIC LIBRARY

each run over the same distance, but compensation should vary nearly enough in ratio to insure the Post Office Department against heavy losses on the support of routes for which there is no public demand and to furnish a spur for the contractor to set out and work with real vigor for traffic increase.

//

Goes Up,—Goes Down

"A DEEP monotonous roar, audible outside the building and a block away, seemed to shake the earth. Brokers, haggard and hoarse, kept up a frenzied clamor in the quest for the attention of a bidder." The bears had the bulls down and were tearing at their throats. And the aircraft securities took an overwhelming punishment along with the rest.

To those who have been among the losers it brings a chilly comfort to reflect that the debacle might have been foreseen. It would be inexcusably cruel to dwell upon past history at the moment, were it not that a proper appraisal of the present situation may help in estimating the future of the aircraft industry and in assuaging the alarms that grow out of a panic so far, at least, purely financial.

Aviation, like most other industries, has had both excessive optimists and excessive pessimists among those participating in or following its development. Sometimes the enthusiasts and the alarmists appear simultaneously, and merely neutralize each other. In the aeronautical world they have come upon us not together, but successively. They have been, in fact, the same individuals in successive phases.

Six months ago no painting of the aeronautical prospect was too roseate for the general public to accept it and enlarge upon it. Production was to be fifteen thousand this year, fifty thousand next, and the figures for 1931 would exceed all bounds of imagination. Naturally desirous of sharing in a future so glorious, they competed frantically for the privilege of acquiring stock certificates representative of a part ownership in the airplane industry. Prices shot upward with a vertiginous abruptness, while many of those who were actually of the industry and in a position to know its actual financial status gaped in frank amazement.

The space of three months turned the tide, and produced a reaction, and a willingness to accept all sorts of rumors of impending diaster, more absurd than the speculative excesses of the spring had been. The whisper of collapse, of firms about to abandon the aircraft business, of unsold planes in sufficient quantities to meet the demand for months to come, and of air lines about to go into bankruptcy has run up and down the land, and it is hardly necessary to say that there has been a mixture of pure imagination and grotesque exaggeration.

Unhappily, this wave of pessimism nearly coincided with a general stock-market collapse, and magnified its effect upon the aeronautical securities. Four months ago the prices of aircraft and air-line stocks in general were too high. They discounted amounts of business beyond any that could be reasonably hoped for for years to come. It was equally clear that last Tuesday the figures were preposterously low, not only making no allowance for the future but not even adequately representing present earnings. The aircraft industry is sound, and among its securities there are to be found admirable investments at the present level. It is to be hoped that they will be absorbed by investors who have taken the trouble to acquire some knowledge of the facts of the industry's position, and that we shall be spared a repetition of a speculative boom, with its feature of wild and largely unintelligent buying and its inevitable subsequent appalling crash. The progress of aviation will fare better without any such dizzy oscillations.

//

Mr. Hill Breaks Out in a New Place

SENATOR BINGHAM of Connecticut needs no defense to the aeronautical world. His enormous services to American aviation are too well remembered, and too warmly appreciated, for anything of that sort. If we had to reckon only with those who have some recollection of aeronautical history, and some knowledge of the course that aeronautical development has followed, we should be content to ignore Mr. Thomas L. Hill's astonishing outburst of last week. We should be satisfied that public opinion would assign to his "charges" against Senator Bingham a value of absolute zero. Unfortunately some part of the general public, which has never known the facts or has forgotten them, may be led by the very violence of Mr. Hill's language to accept his statements at their seeming face value.

While Hiram Bingham, drawing upon his own experience as a pilot and as a student of aviation, was working in behalf of the Air Commerce Act which he introduced in Congress and shepherded to its passage—while he was laboring unremittingly in support of military and naval aviation and to secure an integral fulfillment of the five-year programs—while he was pleading the cause of commercial aviation and the American aircraft industry, and defending them against stupid and malignant attacks often inspired by self-seekers behind the scenes—Mr. Hill was engaged in endeavoring to promote a fatuous and wasteful scheme of subsidy, which has never had any more chance of acceptance by Congress than water has of flowing contrary to the action of gravity.

It needs no extended recollection of aeronautical history to realize that Mr. Hill is playing an old tune. He has not even changed the key. The charge of scandal

monopoly, inefficiency of pilots sent to their death in worthless airplanes, has been heard often before. It has been the subject of some nine-and-ninety investigations, none of which has substantiated those wild denunciations. It was a good tune once, and an audience knowing little of the subject listened open-mouthed to its spectacular effects, but the times are out of joint for its repetition. The public ear has been educated to distinguish true from false harmony, and the dissonances in Mr. Hill's siren song are only too apparent.

It is futile to talk of the inferiority of American aeronautical development in the face of the ability of every reader to make his own comparisons between the recent rate of progress here and that in other countries. It is absurd to try to get anyone to believe in monopoly while every newspaper and magazine reader can see for himself that forty-odd companies are advertising against each other for the public patronage, and while unchallengeable figures show that considerably less than a third of the aggregate business is being done by any one group. It is ridiculous to seek to promote the theory that the Aeronautical Chamber of Commerce is the malign organ of a sinister "trust" while its doors remain open without formality to every actual manufacturer. Where futility and absurdity loom so large it is difficult to make serious analysis and reply, despite the presentation of an aggregation of "exhibits" upon the nomenclature of which a large portion of the alphabet is used up.

Mr. Hill's press release goes on. He alleges fraud and corruption in government purchasing. We earnestly hope that he will have to make some prima facie case not based on mere allegation, before the Senate of the United States will decide to expend its own time and the energies of the War and Navy Departments upon another investigation going afresh over ground so often worked.

Without regard to whether or not individual derelictions or oversights might be dug up here and there, some facts are beyond dispute. It is beyond disptue that the safety record of the United States Army and Navy services is at present superior to that of any other air force in the world, so far as can be gaged from published figures, and that it has been improving at an astonishing rate during the last three or four years. So much for the charges of "inferior and dangerous aircraft." It is beyond dispute that there has been a virtually complete turnover of flying equipment within the last three years, and that the number of modern and serviceable airplanes possessed by the Navy, for example, has increased from 350 to about 900 within that time.

We may have devoted too much space to Mr. Hill's outbreak. It might be better to allow it to pass in silence, but when the evidence of known facts is being disputed, it is well to call them to mind from time to time. Having done that, we are content to leave all such attacks upon the development of American aviation, and upon the men who are devoting themselves to it, at the mercy of the sound common sense of the American people.

Regional Councils and the Airplane Industry

INDUSTRY ultimately finds its own level. It ultimately withdraws from bad locations and establishes itself in those most advantageous, but if left to the pure workings of natural causes the process may be a slow one. Chambers of Commerce, and councils and committees representing a whole state or a group of states, try to "help nature along a little bit."

They often grow clamorous. From the rock-bound coasts beyond Cape Cod to the sun-baked mesas, the cry goes up that the ideal site for the manufacture of airplanes and their parts has been found. Every community seems to yearn for an airplane factory. Perhaps bewildered by so many conflicting claims, the industry remains as scattered as ever. Fully a third of the states of the Union have airplane factories, and important ones.

Such diversity can hardly endure. A far greater degree of concentration is logically called for, and will in time manifest itself. Adjustments are delayed by the natural desire of company executives to entrench themselves in the region that they know as home, and also by the difficulty of making comparisons exhaustive enough to be convincing upon the superiority of one site over another. Local and regional commercial bodies can greatly assist in the process of geographical stabilization, upon three conditions. The information that they give must be complete and accurate, and it must not be over-sanguine.

The first two stipulations will probably be accepted as reasonable. The last may seem to impose an undue restraint upon the exuberance and pride in their work of Chamber of Commerce secretaries, but it is urged as much in the interest of the localities affected as in that of the airplane industry itself.

In seeking new industries for a region it is a common error to throw the net broadcast. No community should be proud of securing an industry which cannot flourish there, and which will ultimately become a drag on its neighbors and a source of periodic unemployment and distress. There are some parts of the United States that are specially adapted by labor supply, climate, transportation conditions, and otherwise for the manufacture of airplanes. There are others where airplanes cannot profitably be made, but airplane engines can. There are still others that can best devote their energies to securing factories manufacturing small parts or instruments. There has been too much of a tendency to treat the aircraft industry as a unit. Sound organization will be favored, and local heartbreaks will be avoided, if those interested in promoting the industrial destinies of a region will analyze carefully just where they best fit into the manufactures pertaining to aeronautics, and then make their plea accordingly. There have been a few example of excellent research work of that sort. They should serve as a pattern for less conservative or less far-sighted "boosters" elsewhere.

HOW THE

John H. Livingston Employed

By JOHN H. LIVINGSTON
Winner of the 1929 National Air Tour

AT THE REQUEST of Mr. Warner, editor of AVIATION, I shall attempt to cite some of the most important points in regard to my preparations for the 1929 National Air Tour and, also, the methods I employed in the actual flying necessitated by the contest.

The Waco Aircraft Company, Troy, Ohio, had asked me to fly one of the two planes it was entering in the Tour. I had planned to, and did, pilot a Waco "225" straight wing model, powered with a Wright "Whirlwind-Seven."

A thorough study of the scoring formula was the first requisite, of course. It will be remembered that this year the formula was modified to a certain extent. The principal change was in the use of one-half the stick time instead of full stick (the landing run measured in time), in computing the figure of merit for each of the contesting planes. Personally, I feel that the original formula expressed very completely the real purpose of the Tour, and that full value should continue to be given the importance of the time of landing and take-off. I do not know of any airplane that is immune so far as forced landings are concerned. If it is possible to make such a landing in an extremely small field, then the ability is the most valuable assurance of the real reliability of the plane. That is true, likewise, of the ability to get out of a small field, but it is not of such great importance, since the pilot may use his own judgment as to the advisability of attempting a take-off.

There is talk of further modifying the formula next year, particularly in reference to the stick and unstick factors. I believe that the formula should be restored to its original form, or at least retained as it is, although I would prefer to see the same weight given to the landing and take-off times as formerly, until we have airways in which landing fields are spaced not more than five miles apart. For that reason, I maintain that the formula should not be altered more. In its original form, and even in its present state, the winning planes must be able to land and take-off in a fairly short space; they must possess good climbing ability; they must have a certain amount of speed and must be able to carry a load. In a word, the formula provides that the winners must show certain characteristics that every plane entered in a reliability tour should possess.

SOME PERSONS will argue that my belief is selfish. They will say that I am advocating the retention of the formula, because it is advantageous to Waco planes, which my company distributes in Illinois and Iowa. But that does not enter into it. If the formula is changed materially before the next National Air Tour, it is not unlikely that I will fly a plane other than a Waco, one that I hope will win the contest whether or not I consider it as good an all around airplane.

However, the discussion of the Tour formula is really beside the point. It was finally decided, in spite of the modifications made in the formula this year, that I would fly the 225 straight wing model. My plane and the one flown by Arthur J. Davis were completed Monday, Sept. 30. I flew mine for the first time Tuesday afternoon at the factory flying field, and the next morning took off for Ford Airport at Dearborn, Mich., arriving there at 8:50 a.m., just 10 min. before the deadline. It took 1 hr. and 40 min. to make the hop.

1929 Air Tour WAS NWO

Describes His Preparations and the Flying Methods He in Running Up His Winning Score of 45,672.64

The plane was a stock model in all respects, except for the addition of a Pioneer turn and bank indicator and an aperiodic compass, which is of British manufacture and is handled in this country by the Pioneer organization. It was my suggestion that these two flying instruments be added, and, incidentally, it was the only suggestion I made to the Waco company.

The reasons for wanting a turn and bank indicator are easily understood, but I might offer some explanation in regard to the compass. It is of the magnetic variety, but it has numerous advantages over the ordinary type. Chief among them is the fact that the pointer indicates the course to be flown after a dial around the glass has been properly set. The glass covers the top of the compass case, as in a mariner's instrument, so that one looks down in it in order to read it. There are four parallel hairs, spaced about three-eighths of an inch apart, across the glass, and the pointer is kept between the two center hairs, which is much easier than watching degree markings. In this compass, also, there is no tendency toward rotation.

The Ford Trophy and its new possessor

There was just one objection to the compass as it was installed in my plane, but that was not of serious consequence. The instrument was designed for mounting at the left of the cockpit, but in that position it interfered with the operation of the stabilizer control. As a result, it was placed on a little metal shelf at the right side, even though the readings were 180 deg. opposite. I used the left-hand throttle, of course. The turn and bank indicator was mounted on the dash, together with an altimeter, an airspeed meter, oil pressure and temperature gages, the tachometer and switch. All but the bank indicator were Consolidated Instruments.

As I say, with the exception of the two additional instruments, the plane that I flew in the Tour was a stock model. In fact, it differed only slightly from the Wright J-5-powered Waco that was flown to victory in 1928. The most apparent changes were an increase in the area of the elevators and horizontal stabilizer, and the adoption of a new split type of landing gear in which the strut carrying the Oleo shock absorbing unit has been shortened and the unit itself better streamlined.

The wheels on the plane might be said to have been special equipment at the time, although I have been given to understand that the straight wing 225's are now being equipped with them. The experimental department of The Waco Aircraft Company had been conducting a series of tests with two sets of Bendix roller bearing brake wheels, and it was these wheels that were installed on the Tour entrants. The advantage of the wheels is that they are smaller than the type previously utilized, permitting the use of 26x5 in. tires instead of the customary 30x5 in. size. The resulting reduction in parasitic resistance probably added one mile an hour to the speed of the plane. Incidentally, the brakes are operated with the heels.

The wing roots were faired into the fuselage with larger streamlined shapes than have been used heretofore. It is known that there is no lift to speak of on an airfoil at the point where it joins the fuselage, because of the turbulence that is created. These shapes were designed to reduce that turbulence to a minimum, with a resultant increase in the speed of the plane from perhaps one to two miles per hour. This streamlining cannot be considered a special job, since all Waco planes may be fitted with the fairing at a slight extra cost. For passenger carrying, however, the streamlining probably would be of little value, since it is of such proportions as to entirely cover the walkway on each side of the fuselage.

Two types of cowling are available on the new 225

straight wing. One is built up higher around the forward cockpit, providing better streamlining, while the other is lower and has a wider opening for ease in getting in and out. The latter is advantageous for passenger carrying, although the cockpit with either type is large enough for two persons. The more streamlined type of cowling, of course, was selected for the Waco entries in the National Air Tour. But so much for the plane itself.

The official speed trials were held at Ford Airport, Thursday, Oct. 2. In setting the speed factor required by the formula, I bore in mind the fact that the rules of the Tour required that all legs be completed at 85 per cent of the top, or formula speed. Inasmuch as some 5,000 miles of flying obviously could not be done at the highest possible speed, I decided to set a formula speed in the neighborhood of 10 m.p.h. below the maximum of the plane. This was done by going into a shallow dive at an altitude which would have allowed me to increase the speed over the course by nosing the plane down, rather than necessitating opening the engine up. Needless to say, I was anxious to save the engine as much as possible. At any rate, the actual speed demonstrated was 135.44 m.p.h.

The remainder of the official tests were to have been conducted the next day, but were postponed to allow a number of entries that had been delayed in the East by the weather an opportunity of competing. Some mention of these tests may be of interest.

After the start of last year's Tour, there was some dissatisfaction among the contestants at the low landing time figures. I was present at the tests, but I did not see anything that might have been the cause of criticism, although it was said that certain pilots had made "pancake" landings. With that in view, I was much pleased on learning that the officials had ruled this year that the landings and take-offs would be made on a concrete runway, providing the same surface for everyone.

A little experimenting soon showed conclusively that a pancaked landing was of no value in decreasing the landing run, because a plane that was pancaked on the concrete bounced, thereby lengthening the time. It was found that the best and shortest landing was of the orthodox three-point variety. By making a perfect landing of that type, I found that the airplane I was using could be set down regularly in less than 100 ft.

In the take-offs, the brakes were applied and the tail lifted to a point above its position in normal flight. Then the brakes were quickly released and the stick pulled back after the plane had gained plenty of flying speed. An attempt to pull the plane off too quickly added materially to the take-off time.

WHEN THE TESTS were finally completed, the figure of merit for my Waco seemed rather attractive. However, no one at the start felt too certain as to the final outcome of the Tour. This was the result principally of the ruling that no work could be performed on any of the planes entered, outside of the 2-hr. period set aside for that purpose each day before the take-off. I am happy to say that on my own airplane, as well as that of Mr. Davis, no mechanical work became necessary other than the routine cleaning of the gasoline and oil strainers and a periodic checking of the valves.

According to the formula, it was necessary for me to maintain a speed at all times of 115.124 m.p.h. For that reason, I planned to set a ground speed of 120 m.p.h., in order to compensate for any possible errors in my own watch or the watches of the timers. I was fortunate in that this speed made it easy to check my position at any time, for it was just two miles a minuts.

I used standard Rand McNally-maps of the various states and the Canadian provinces through which the Tour led us. In addition, I also carried a number of Department of Commerce "Airway Bulletins," which showed the various airports where the Tour planes were to land in more detail than did the larger maps. While it was not necessary to use the bulletins to any great extent, I felt that they would be of value in thick weather.

Each night while the Tour was in progress, although I must admit that it was done sometimes in the cockpit

John Livingston in his winning plane, with Robert Willett, Waco factory representative in the forward cockpit

Livingston's Whirlwind powered Waco in flight

before the take-off in the morning, I attempted to set my course for the next leg. This was done on the map through the use of a Pioneer compass protractor. The variation was shown on the maps, while the deviation was obtained from a chart worked out for the plane by one of the service men of Pioneer Instrument Company before I left Detroit. With the true course, the variation and deviation, it was a simple matter to determine the compass course.

On the map itself, I drew a straight line from one landing field to the next, and then marked that line off at 10-mile intervals so that I might check my position every five minutes. My stop watch, of course, was set when the plane was given the starting signal. The unfortunate part was that there was nothing on the ground with which I might check at such short intervals in all cases. However, I lost no time as a result of poor navigation.

On the hop from St. Louis to Springfield, Mo., for example, there was nothing along the airline route on which it was possible to check my position until I had flown 30 miles. At that point, I checked on a railroad and found that I was one and one-half minutes late, according to my 120 m.p.h. schedule. That meant that I was three miles behind, figuring the speed at two miles a minute. There was an hour more of flying left on that leg. I was already three miles behind at the end of the first 15 min., and it was apparent that if I continued to fly at the same speed for the next hour, I would be behind 12 miles more. I was particularly anxious to maintain a speed of 120 m.p.h., because we were getting over toward the Kansas plains, and, incidentally, the Kansas winds. For that reason, I gunned the engine until I reached a speed of 15 m.p.h. faster than I had been traveling. As a result, I came in four minutes ahead of time with an average speed of 123 m.p.h. for the run.

As a general rule, I compensated for the wind as my experience dictated while in the air. The observation of cloud shadows, when there were any cloud shadows to observe, helped some, and the weather reports with which we were supplied were of value, too. Although the Tour planes met with head winds a good portion of the time, there was one leg on which we had a tail wind of more than 60 m.p.h. That was on the run from Toronto to Ottawa. It was impossible to estimate the speed of the wind with any degree of accuracy at the start. However, I knew that I was making good time even though I throttled the engine down until the airspeed meter showed from 90 to 95 m.p.h. There was little to check on until an hour had passed, and then I found that the plane had traveled 160 miles.

In the event of bad weather, I planned to check on everything possible along the course. That again is a matter of experience. While the total number of hours I have in the air is not excessive, much of my experience has been in virgin cross-country work. As a result, I think that perhaps I have developed a knack of recognizing little things that help me to stay on the course—things that another pilot might overlook.

For example, the map may show two towns, practically the same in size, with railroads entering them at the same angle. Let us assume that there is a river, and that, too, looks about the same in reference to the towns. However, the map may show that the river makes a slight bend near one of those towns. That bend can be used to identify it. Some pilots, not accustomed to the particular type of cross-country work to which I refer, might fail to notice that bend entirely.

If the weather became too thick, I planned to follow a railroad or a river, provided it was not too far off the course. We had an example of the value of that on the Tour between St. Paul and Wausau, Wis. I was flying along the course when I saw that several of the Tour planes had landed. I went down also to determine the reason and was told that there was thick weather ahead. Some of the planes had attempted to go through and had returned. However, I wanted to maintain my perfect score, if that were possible, so I took off again. The report concerning the weather was correct. In fact, there were about 30 miles that I flew along the treetops. In that instance, I followed a compass course, but as it happened there was a railroad running parallel to it, which would have been of the utmost advantage had the weather been any thicker. The stop took five minutes, but I came in eight minutes ahead of time on that leg anyway.

THE WHIRLWIND-SEVEN in my plane, which turned up 2,100 r.p.m. at full throttle, was never run wide open for a full leg of the Tour. That is shown by the fact that the maximum oil temperature throughout the entire 5,000 miles of flying was never over 172 deg. F., while the average temperature was from 135 to 145 deg. F. It would be impossible for me to estimate the average number of r.p.m.'s at which I operated the engine, for its speed was constantly varied to meet the conditions. I attempted to maintain a speed of 120 m.p.h., and the engine was operated to give me that speed, which I felt was a safe margin over that required to establish a perfect score. It may be of interest to note that in checking my log, I find that the average speed of my Waco for the 5,017 miles flown was 129.97 m.p.h. Mr. Davis maintained an average speed of 129.82 m.p.h.

At this point I might mention the splendid performance of the two Wacos. The landing and take-off times differed only by fractions of seconds in each case, and I suspect that Mr. Davis set his time speed intentionally low, probably at the suggestion of the factory, as a safety precaution in view of the fact that mine was set a trifle high. Mr. Davis was robbed of a perfect score only because of an error in his own stop watch timing in the flight to Springfield, Mo.

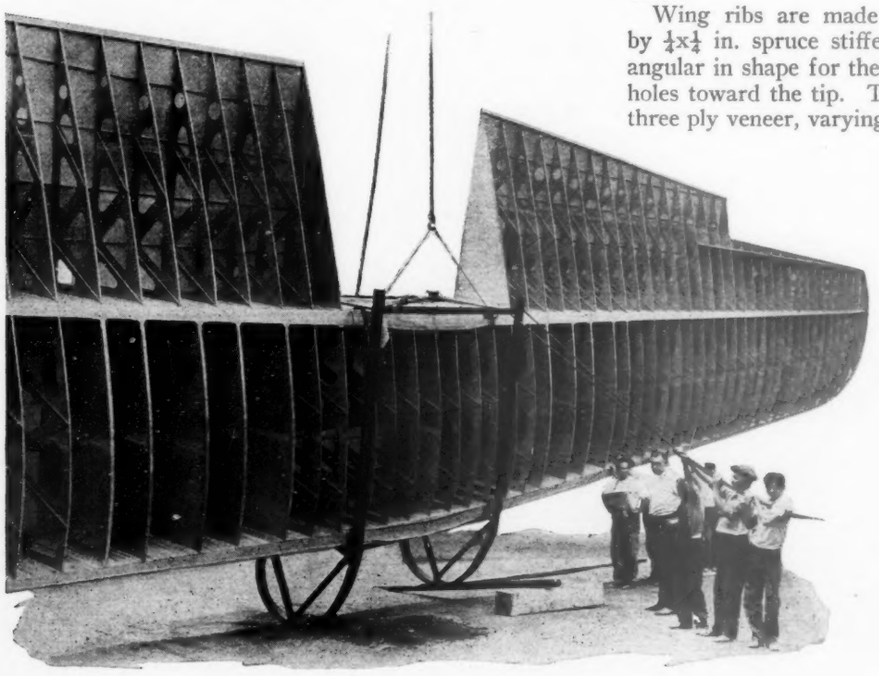
THE *Fokker F-32*

TRANSPORT MONOPLANE

IN ORDER to meet the demand for a transport plane of greater passenger capacity than the F-10-A, the Fokker Aircraft Corporation, Division of the General Motors Corporation, has developed the F-32, a four engined, thirty-two passenger monoplane of 22,500 lb. gross weight. The first airplane of this type has been test flown and the second is under construction at the Teterboro plant, while preparations are being made to fill an order for five of these airplanes for Western Air Express to be used in service between Los Angeles and San Francisco, Calif.

Although the characteristics of Fokker practice are noticeable in many of the design features, there are several interesting departures, most of which have been necessitated by the increased size and weight of the airplane. Probably the most noteworthy of these is the disposition of the four Pratt & Whitney Hornet engines in "twin tandem" arrangement. Each pair of engines is mounted in a nacelle below the wing and at the side of the fuselage, the forward engines having two blade tractor propellers, and the rear engines pusher propellers of the three blade type. This power plant influences the design of landing gear and tail surfaces which will be treated in detail later.

Photograph of the wing structure of the Fokker F-32 showing construction details including the specially designed joint between the halves of the spars.



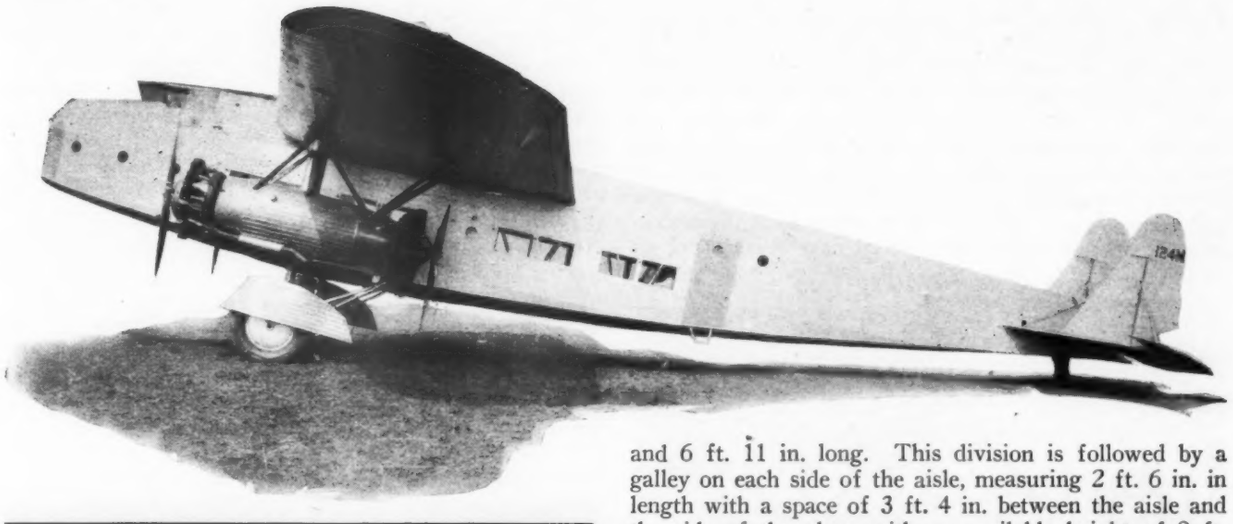
THE F-32 has a wing span of 99 ft., an overall length 69 ft. 10 in., and an overall height of 15 ft. 6 in. The weight of the plane empty is 14,200 lb. and the gross weight 22,500 lb. The wing loading is 17.92 lb. per sq.ft. with full fuel load at take off and the power loading is 10.73 lb. per hp.

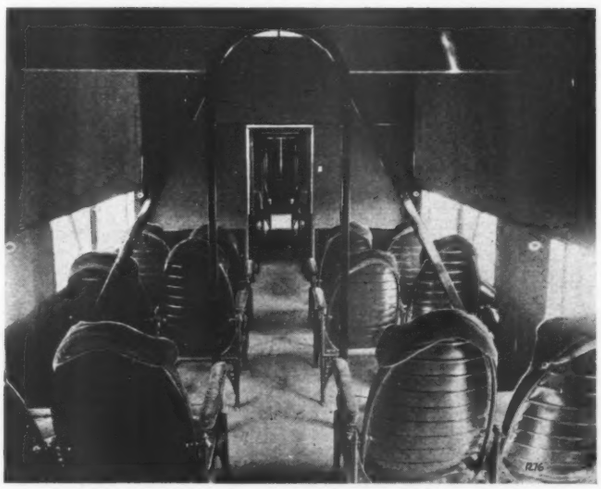
The wing has a total area of 1,350 sq.ft. and follows Fokker cantilever design. It is of two spar construction. Spars are tapered and of the box type, with upper and lower laminations. They are built up of $\frac{1}{2}$ in. laminated spruce, separated by compression members and covered, front and rear, by a plywood web. The height of the front spar at the center is approximately 44 in. To facilitate manufacture and because of the fact that the spars are swept back, they are constructed in two halves with a joint at the center. This joint is of special design and intended to carry the loads from one half to the other.

Wing ribs are made of $\frac{1}{16}$ in. plywood, reinforced by $\frac{1}{4}$x$\frac{1}{4}$ in. spruce stiffeners. Lightening holes are triangular in shape for the center ribs and change to round holes toward the tip. The wing cover consists of birch, three ply veneer, varying from $2\frac{1}{4}$ mm. (0.088 in.) at the center section to 1.2 mm. (0.046 in.) at the tips.

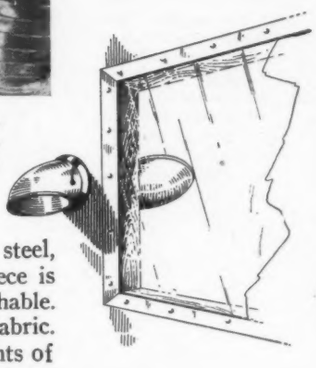
Sweep back of the leading edge amounts to 56 in. and the dihedral to $3\frac{1}{2}$ deg. The total aileron area is 87.6 sq.ft. The ailerons are of the Frise type, constructed in accord with standard Fokker practice and attached to the wing by four bearings each. They are also equipped with paddle balances.

The fuselage is built of chrome molybdenum steel tubing with welded joints, covered with doped fabric, except at the nose where a cowling of beaded aluminum alloy sheet is used. In general the construction is





Above—Cabin interior showing decorative fairing of bracing members. Right—A sketch of the simple and efficient ventilator developed by the Fokker Aircraft Corporation engineers



similar to that of the F-10 models. Mild carbon steel, however, is used in the F-10. A fuselage tail piece is used to fair the end of the fuselage and made detachable. This is a light steel tube frame, covered with fabric. On this portion of the fuselage are mounted tail lights of Pyle National make, one on each side at the top of the fairing.

The cabin floor is of the truss type, made up of 0.020 aluminum alloy sheet deeply corrugated and covered with $\frac{3}{16}$ in. plywood. Riveted aluminum alloy plate girders are used for floor beams and are capped with flanged tube members at the bottom and have vertical stiffeners of channel section. The baggage compartment which is located under and in front of the pilot's cockpit floor and occupies the front portion of the fuselage has a capacity of 100 cu.ft. Two Pyralin windows, $8\frac{1}{2}$ in. in diameter, are located one on each side. The space available for radio installation is 3 ft. 4 in. long, 3 ft. 9 in. high and 7 ft. wide, extending from one side of the plane to the other.

There are four passenger compartments. The forward compartment, directly behind the pilot's cabin, is 7 ft. 7 in. wide, 5 ft. 9 in. high and 6 ft. $\frac{1}{2}$ in. long. The second compartment is 8 ft. 10 in. wide, 7 ft. 5 in. high and 6 ft. 11 in. long. This division is followed by a galley on each side of the aisle, measuring 2 ft. 6 in. in length with a space of 3 ft. 4 in. between the aisle and the side of the plane with an available height of 8 ft. 6 in. One $8\frac{1}{2}$ in. in diameter window is located on each side, and two on the ceiling. The third compartment located directly behind the galley measures 6 ft. 8 in. in length, 8 ft. 7 in. in width and 8 ft. 1 in. in height. Directly behind this compartment is the last compartment which is 6 ft. 8 in. in length, 8 ft. 3 in. in width and 7 ft. $8\frac{1}{2}$ in. in height. Behind this last compartment and running across the plane is the entrance, 2 ft. 6 in. long, 8 ft. 2 in. wide and 6 ft. 11 in. high. There are two aluminum frame entrance doors one on each side, 2 ft. 6 in. wide and 4 ft. 9 in. high. These are the entrance doors for the passengers. Each one of these doors has an 8 in. diameter round window. Located directly behind the entrance compartment are two lavatories 2 ft. 10 in. long by 3 ft. $9\frac{1}{2}$ in. wide, with head room 6 ft. $6\frac{1}{2}$ in. The cabin has sixteen windows, 26 in. long by 16 in. high, of $\frac{3}{16}$ in. nonshatterable glass and which are permanently mounted. Ventilation is provided by means of eighteen S shaped tube ventilators, each having a throat diameter of $\frac{7}{8}$ in. These ventilators are so arranged that by turning them, either suction of cabin air, or pressure of outside air into the cabin can be regulated. This simple and effective ventilator design is a Fokker development.

The center aisle of the cabin is 2 ft. 1 in. wide with an average height of 5 ft. 10 in. As a day transport, provision is made for 30 passenger seats, arranged into four compartments. As a night sleeper, the cabin is transformed into eight sections, accommodating sixteen berths, eight upper and eight lower. Any combination of passenger, mail and express can be worked out to suit any particular commercial demands.

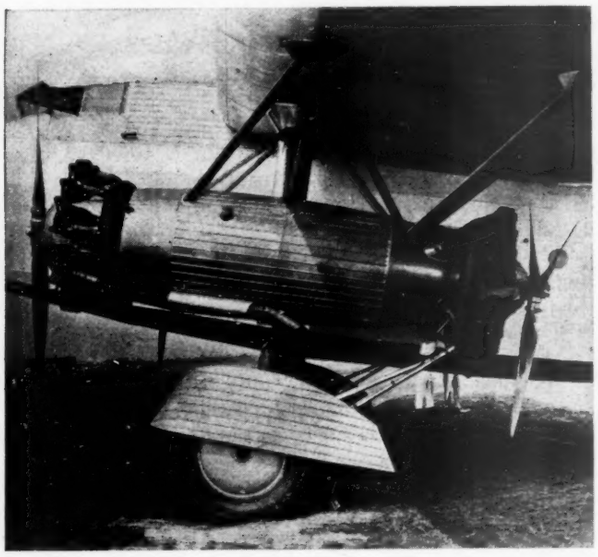
The cockpit enclosure is of the usual Fokker type, that is, with an inwardly slanted V front of 110 deg. included angle. The two sliding front windows are $\frac{1}{4}$ in. Duplate, $21\frac{1}{8}$ in. long by 12 in. high. The two sliding windows are also $\frac{1}{4}$ in. Duplate, 20 in. long by 16 in. high. The cockpit enclosure is faired into the wing nose, and has at its forward part two top doors of reinforced aluminum with green celluloid windows for upward

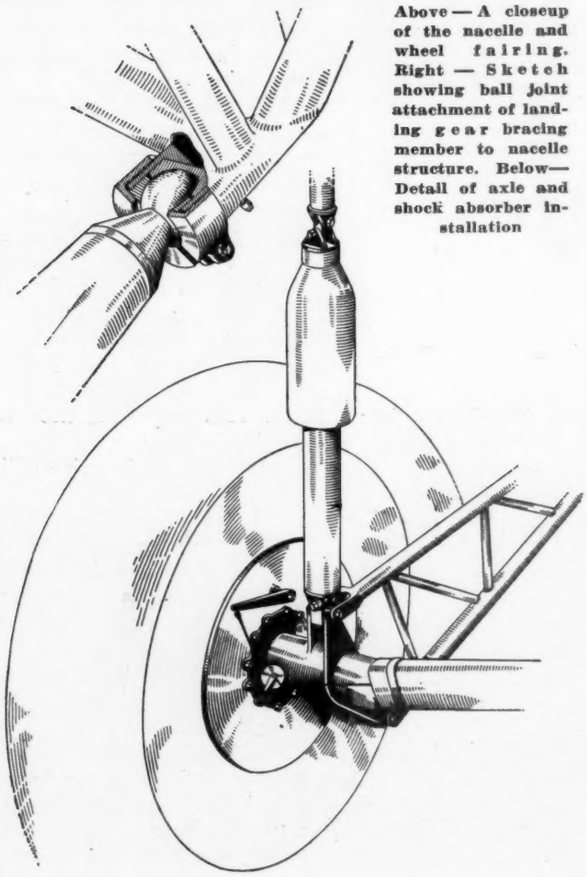
visibility. The top of the cockpit enclosure is domed, and aft of the pilot seat the enclosure sides are of 0.020 corrugated aluminum alloy, properly reinforced and sealed at the wing nose with Home Comfort weather strips.

Three instrument boards are provided. The main instrument board contains the engine tachometers, oil pressure and temperature indicators, ignition switches, and master cutout switch. On the left side of the instrument board is mounted the special navigation panel on which is mounted compass, rate of climb indicator, altimeter, air speed and bank and turn indicator.

A rear instrument panel is located directly behind the pilot's seat at the center and easily reached has mounted on it the controls for carburetor air intakes, mixture controls, spark controls, starter switches and vibrating coil switches. On the right side of this board are the right flare release, right engine nose cowling controls, right oil tank vent, similar controls being located on the opposite side of this board. An additional board located on the left side of the co-pilot seat and directly under the secondary board, provides for all the light switches and fuse panels.

The baggage compartment is lined with corrugated aluminum over a distance of 30 in. above the floor and all around the portion forward of the cabin bulkhead. The trap door 27 in. wide by $40\frac{5}{16}$ in. long, hinged at the rear, faired with the fuselage outside covering and flush with the pilot's compartment floor can be used for the pilot's entrance and exit, and loading baggage. This ladder has a telescopic extension used to permit access to the compartment through the trap. As the pilot's floor is relatively high, a permanent ladder with three steps is used to reach it from the cabin floor level. The wing is attached to the fuselage by means of four bolts connecting the spars to the fuselage structure, the fuselage fittings being parallel to the longerons. The wing is faired into the fuselage by curved aluminum strips to reduce resistance and improve the appearance.





Above — A closeup of the nacelle and wheel fairing. Right — Sketch showing ball joint attachment of landing gear bracing member to nacelle structure. Below— Detail of axle and shock absorber installation

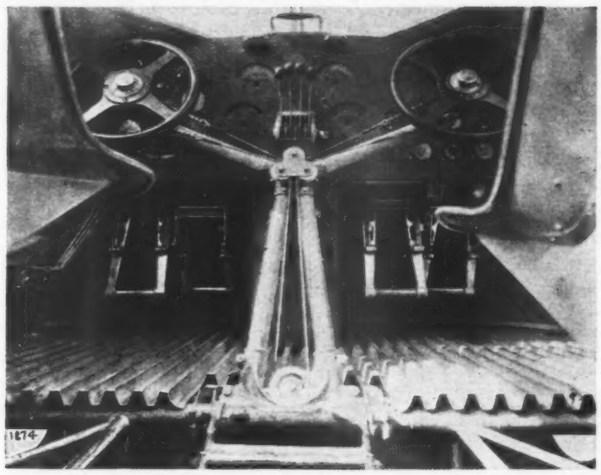
THE TREAD of the landing gear is 20 ft. Bendix wheels, 54x12 are used, with Bendix wheel brakes, having a drum of 20 in. diameter and brake lining 2 in. wide, tire size 58x14. The landing gear is of the divided axle type with brace struts connecting the axle at the wheel, with the nacelle structure just ahead of the rear engine. The connection of this strut to the nacelle as well as the connection of the axle at the fuselage, is by means of a ball and socket.

Axles proper are made of 4 in. diameter chrome molybdenum steel tubing, $\frac{1}{4}$ in. in wall thickness, and are heat-treated to 180,000 lb. per sq.in. The wheels are equipped with Timken roller bearings. The brace strut is of the "Vee" type, cross braced with the apex of the Vee at the nacelle. This strut also takes the brake torque reaction loads.

The shock absorber strut consists of an oleo pneumatic cylinder, available stroke for shock absorbtion being 5 in. It is fastened to the bottom of the nacelle by means of a universal lug and connected to the bottom at the brake flange similarly. To reduce resistance, wheel fairings of corrugated aluminum alloy, fastened to a light steel tube structure, are used.

The tail wheel is mounted in a special fork and is equipped with 21x6 tire. It is mounted on Timken Roller Bearings. The tail wheel castor is 10 in., and the fork construction is of chrome molybdenum steel tubing. There is a thrust bearing at the top of the fork center tube—360 deg. rotation of fork is permitted. The normal rotation is 30 deg., but should a sudden side load demand greater rotation, an automatic release relieves the sudden load and permits complete wheel rotation. In addition a hand release is also provided for moving the plane around by ground crews. This tail wheel is also provided with a fairing similarly constructed to that of the landing gear wheel fairings.

One of the interesting features of the plane is the power plant which consists of a twin-tandem installation



The control compartment of the Fokker F-32 transport plane

of four Pratt & Whitney Hornet engines rated at 525 hp. each. Two of these engines are mounted on each side on a nacelle structure of welded chrome molydenum steel tubing. The engine mounts follow the standard Fokker practice, i.e. a ring with welded lugs for engine mounting bolts.

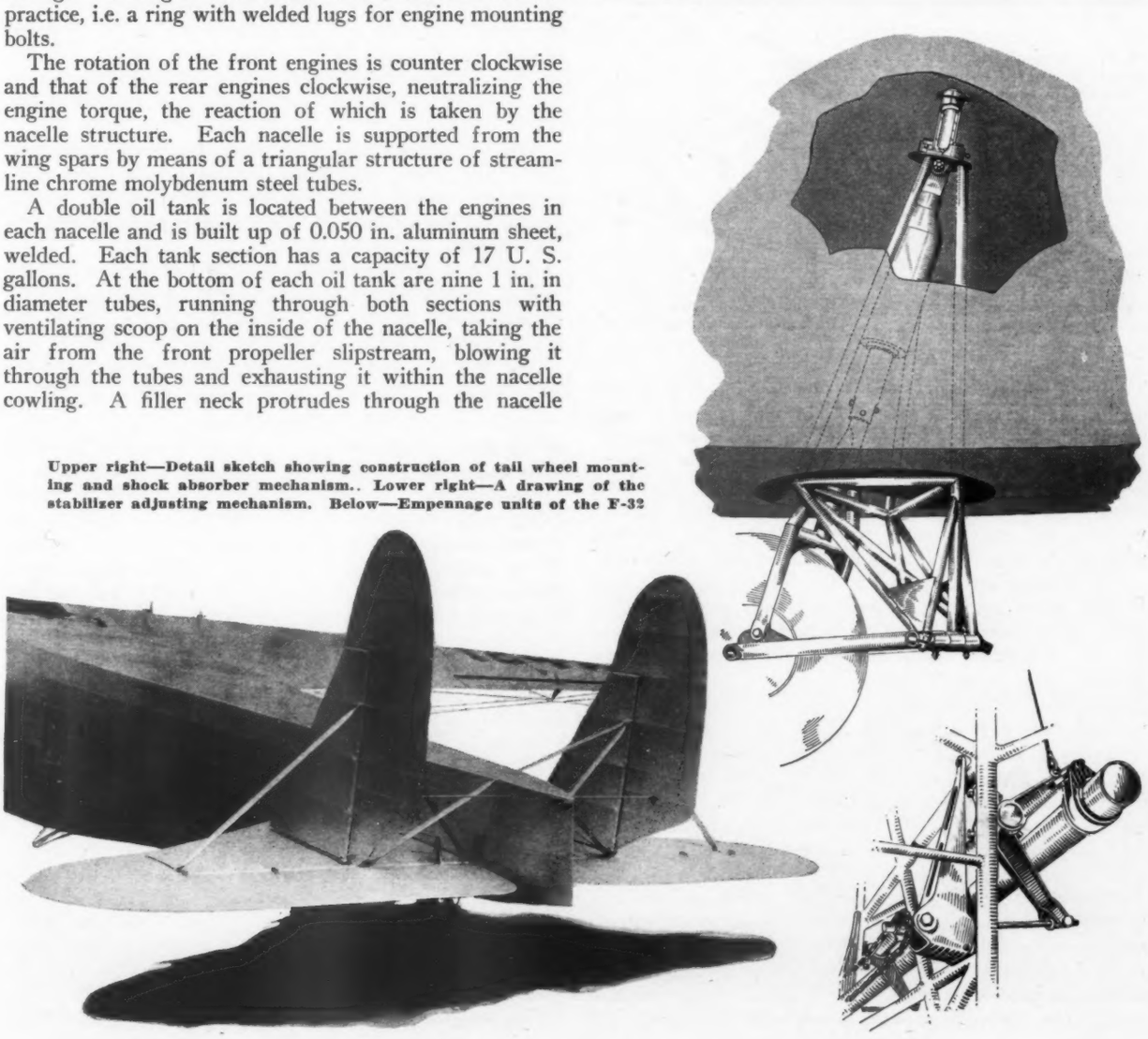
The rotation of the front engines is counter clockwise and that of the rear engines clockwise, neutralizing the engine torque, the reaction of which is taken by the nacelle structure. Each nacelle is supported from the wing spars by means of a triangular structure of streamline chrome molybdenum steel tubes.

A double oil tank is located between the engines in each nacelle and is built up of 0.050 in. aluminum sheet, welded. Each tank section has a capacity of 17 U. S. gallons. At the bottom of each oil tank are nine 1 in. in diameter tubes, running through both sections with ventilating scoop on the inside of the nacelle, taking the air from the front propeller slipstream, blowing it through the tubes and exhausting it within the nacelle cowling. A filler neck protrudes through the nacelle cowling with an opening $2\frac{3}{4}$ in. in diameter. The oil lines are 1 in.x0.049 aluminum tubes, with the exception of the vent pipe which is $\frac{3}{4}$x0.049 aluminum tubing.

The two-way primer cock and pump is mounted on the bottom of each nacelle and near the rear engine. Electric inertia starters are standard equipment, and an engine driven generator is mounted on each front engine. The conventional booster magneto has been replaced with a vibrating coil for each pair of engines with control switches in cockpit.

THE FRONT PROPELLERS are two-bladed tractor type, 10 ft. in diameter, while the rear propellers are three-blade pusher type, 9 ft. in diameter. These propellers are of Standard Steel Manufacture with adjustable blades. The minimum ground clearance of the rear propeller is 2 in. and the clearance of the rear propeller with the fuselage is 11 in. The center distance between the nacelles is 20 ft. or the same as the landing gear tread.

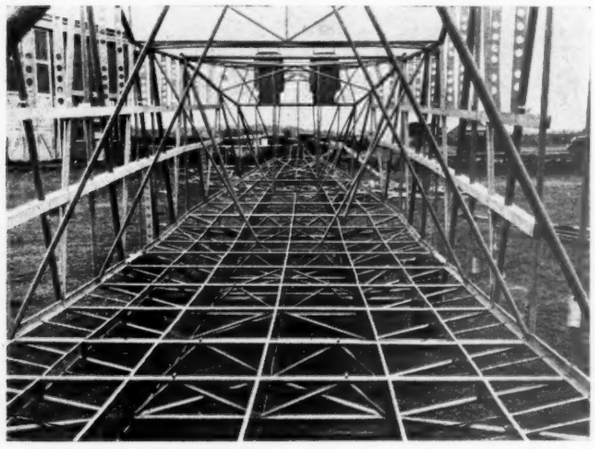
Four fuel tanks, each having a capacity of 175 gal., are mounted in the wings between the spars. There are two tanks on each side. These tanks are made of aluminum 0.050 in. thickness and welded. The fuel system connection is so arranged that either front or rear engine or both on the same side can be fed from



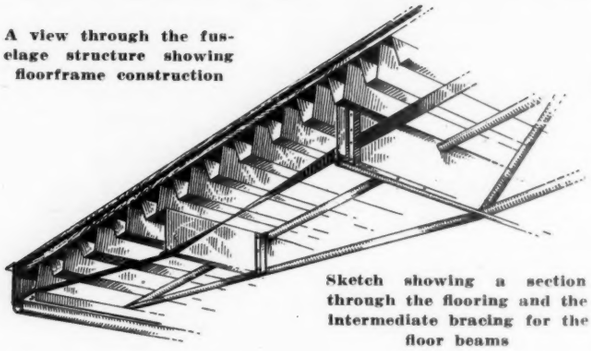
Upper right—Detail sketch showing construction of tail wheel mounting and shock absorber mechanism.. Lower right—A drawing of the stabilizer adjusting mechanism. Below—Empennage units of the F-32

either one or two tanks on the same side. The fuel cocks used are of the E-2 type and are located directly over the nacelle and controlled from the cockpit by shafts. The fuel lines are of $\frac{5}{8}$x0.032 copper tubing. There are no fuel lines inside the fuselage.

Each engine exhaust manifold has been constructed of oval section with the object of reducing area resistance.



A view through the fuselage structure showing floorframe construction



Sketch showing a section through the flooring and the intermediate bracing for the floor beams

The front exhaust manifolds have a single outlet, located on the outside of each nacelle. The rear engine exhaust manifolds have two outlets, one on each side and deflected outward to obtain better diffusion of the exhaust gas in the slipstream. The nacelle cowling at the center consists of fixed corrugated aluminum alloy panels; whereas the engine cowls front and rear are fastened with safety pins and bullet bolts for easy engine servicing.

The heating arrangement of the cabin consists of two F-10A cabin heaters mounted on the front manifold outlet and connected to the cabin heating ducts by means of two streamline ducts between the nacelle and the fuselage, one on each side.

The tail surfaces are made up of welded chrome molybdenum steel tubing, facric covered and doped, and held by pyramidal bracing to the fuselage to obtain maximum rigidity. There are two rudders and two fins. Both rudders and elevators are balanced. The total stabilizer area is 77 sq.ft., the combined rudder area is 39.2 sq.ft., the combined fin area is 28.9 sq.ft. and the elevator area is 72 sq.ft.

Dual elevator and aileron controls, interconnected and positively operated by means of a sprocket and chain on control wheels are provided. The control wheels diameter is 14 in. and the normal displacement for full aileron control is 360 deg. Rudder controls with flop pedals for alternating position are also provided. All controls are connected by flexible cables $\frac{5}{32}$ in. in diameter. Rudder and elevator cables running in enclosed channels on each side of the fuselage and above the windows. Aluminum ball bearing pulleys are used throughout.

Engine throttle and mixture controls are centrally located on the main instrument board, the two outside levers operating the front engines and the center levers the rear engine throttles. These levers are connected to the throttles by bell cranks and rods. The fuel cock controls are connected to the rear instrument board panel by torque shafts and a casting with eight bevel gears for right angle drive which is mounted on the front spar.

Fifty turns of the stabilizer handle are required for full travel of the stabilizer. The stabilizers are pivoted at the rear with the operating shaft at the front and extending through slots in the fuselage cover.

Navigation lights, Ryan retractable landing lights and instrument board lights are furnished with the plane as Standard equipment. There are twelve cabin lights when used as a day transport. When used as a night transport air sleeper, berth lights are substituted. As mentioned before electric inertia starters are used and controlled from the cockpit. Two 65 ampere hour batteries are standard equipment. It may be mentioned here that the fuel guages are of the electric type as manufactured by the General Electric Company and based on the principle of the fuel pressure head, acting on a carbon pile resistance. Four electric tachometers with suppressed zero and of Weston manufacture are used as indicators for engine's speed.

The following special equipment can be incorporated: Two Wiley flares located at the rear of the toilet compartment, operated by Bowden cable from the pilot's cockpit; Pressure type fire extinguisher if requested can be installed.

Approved type certificate weight includes navigation lights, landing lights, electric inertia starters, two 65 ampere hour batteries, toilet equipment, but no flares and no pressure type fire extinguisher.

The specifications furnished by the manufacturer are as follows:

General Specifications

Wing span	99 ft.
Overall length	69 ft. 10 in.
Overall height	16 ft. 6 in.
Wing area	1,350 sq.ft.
Ground angle	10½ deg.
Wing loading	17.92 lb. per sq.ft.
Power loading	10.73 lb. per hp.
Load factor (level landing and high incidence)	4.5

Day Transport

Empty weight	14,200 lb.
Crew of two	340 lb.
Fuel 400 gal.	2,400 lb.
Oil 40 gal.	300 lb.
Payload	5,260 lb.
Useful Load	8,300 lb.
Gross weight	22,500 lb.

Night Transport

Empty weight	14,200 lb.
Crew of three	510 lb.
Fuel 700 gal.	4,200 lb.
Oil 50 gal.	375 lb.
Payload (16 passengers)	3,215 lb.
Useful load	8,300 lb.
Gross weight	22,500 lb.

THE *Opel* ROCKET PLANE

A Brief Description Based on Authentic Material Received From AVIATION'S German Correspondent

WHEN NEWSPAPERS all over the world carried the story of Fritz von Opel's successful flight in a rocket plane, Sept. 30, the event was a signal for reviving and amplifying all the wild theories about possible uses of rockets which have been floating around for years. Comparatively little attention was given to accurate reporting of the flight itself, and the equipment.

As a matter of fact, rocket propulsion had been used with some success by the German pilot Stahmer some months before, in connection with the flight of a regular airplane. Herr von Opel's achievement consisted in making the first take-off, sustained flight and landing with the aid of rockets only, keeping his machine under reasonable control during the whole procedure. Admittedly, both the plane and the flight were strictly experimental in character, and were intended to secure further information rather than to prove the immediate practicability of rocket flying.

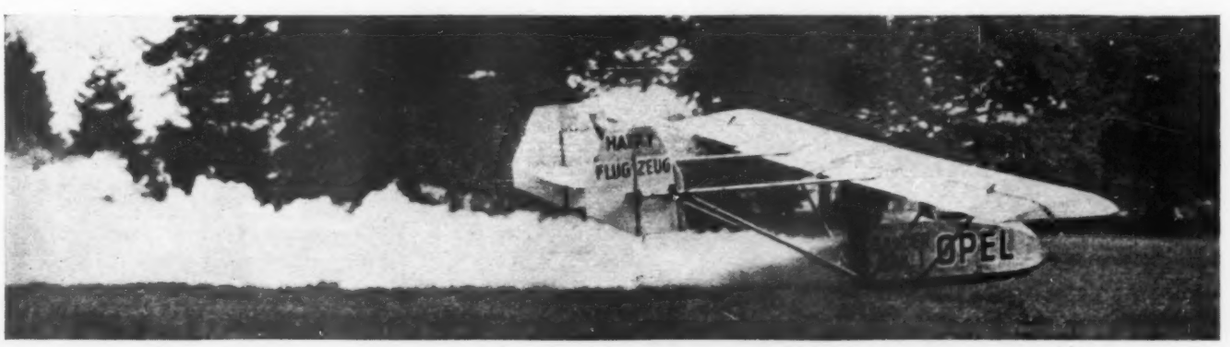
The machine used, as described by Herr von Opel himself, was a simple glider, with a single cantilever wing of wood construction. The edges of the wing were planked with wood and the remainder covered with fabric. The fuselage, of simple braced wood construction with stout ash runners beneath it, was only large enough for the pilot, a conventional type of control stick, and a space in the rear for the box containing the rockets. It was attached to the body by means of sloping struts, supplemented by duralumin tubes to support the rocket container. These tubes were also stiffened by supports attached to the keel. The tail consisted of a horizontal braking surface, to which the elevator was attached. Adjacent to the latter were two fins to which the rudders were fixed. The tail surfaces, in the same plane as the wing, were attached to the wing and to the fuselage by outriggers. These were so arranged as not to be in the path of the rocket explosions.

The box containing sixteen rockets in rows of four fitted into the abbreviated fuselage directly behind the cockpit. Their detonation was controlled by a mechanism placed near the left hand of the pilot. Eleven of the rockets were of the Sander continuous burning type which produces a uniform thrust of about 50 lb. for a period of 25 sec. The other five were of a quick-burning type used in landing.

For the take-off, a runway was constructed, consisting of two U-shaped rails which served as a track for a small car upon which the plane rested. This car was also propelled by rockets, and in the 50-ft. useful length of the runway, attained a velocity of about 65 m.p.h., using only three rockets, each of which had a thrust of about 660 lb. In the opinion of Herr von Opel, the same velocity might be attained on a runway only 25 ft. long without causing serious discomfort to the pilot. The acceleration was somewhat increased by a special arrangement of the rubber cable which was used to stop the carrying car after the plane took off. Special braces were provided to prevent the plane from taking off before the carrying car reached its maximum velocity.

THE FIRST TWO TRIALS resulted in failure, but the third, from the point of view of the experiment, was entirely successful. Unfortunately, the comparatively small area of the Frankfort airport made it necessary for Herr von Opel to make a downward turn after attaining an altitude of only about 50 ft. With a tail wind, he was unable to maintain complete control of the machine, and it was consequently damaged in landing. The average velocity during the flight was about 95 m.p.h. The thrust of the rockets was estimated as varying between 145 and 220 lb.

Herr von Opel and his assistant, Friedrich Sander, who designed the rockets, are planning further tests with a new plane, which will probably be of light metal rather than wood construction. A longer runway will be used, and a much larger airport selected for the scene of operations. It is also possible that rockets using a new liquid explosive developed by Herr Sander, instead of the present powder rockets, may be used in future trials.



Fritz von Opel taking off in the rocket plane at the Frankfort Airport

MAKING THE *Airport* PAY FOR ITSELF

By J. E. BULLARD and AVERY E. LORD

LARGER, better and more airports is the crying need of the aviation industry today. Though we have been making rapid progress in all other directions, there is not yet a single airport in the United States that offers a landing area on which the largest planes now built can land and take off, every day in the year, with perfect safety, and which has a union passenger terminal where passengers can debark from and embark on any plane, of any airline using the port, without leaving the terminal building. Before the passenger business can be developed to the greatest degree this condition of affairs will have to be changed. Adequate, safe airports will have to be provided at every stop and more attention given to the comfort and convenience of passengers.

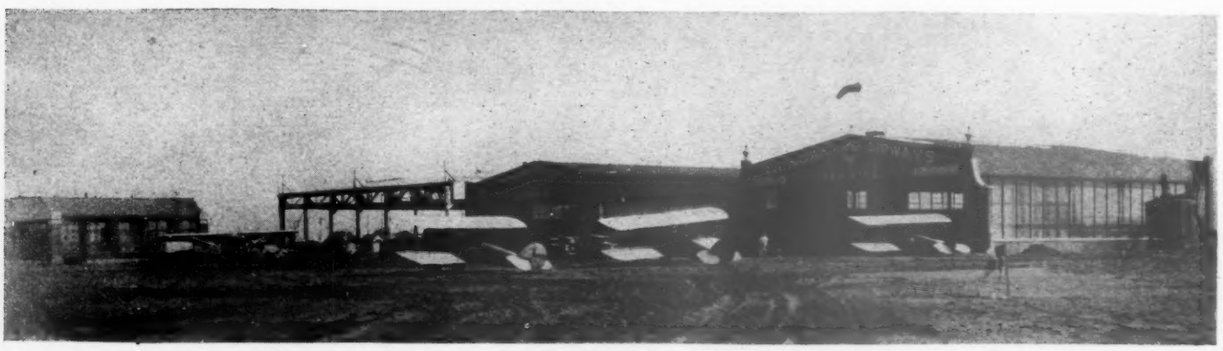
That the future of the industry requires that the major part of the airport development be in the form of public ports is demonstrated by the history of motor vehicles. Soon after 1824 steam stage coaches were built and operated in England. One of the lines operated was between Cheltenham and Gloucester. These coaches attained an average speed of between ten and fourteen miles an hour and there is every reason to believe that the motor bus business would soon have secured a firm footing had the steam coach lines not been denied the use of the highways.

Obstructive legislation was passed. Prohibitive tolls were charged and the climax reached in 1865 when an act was passed that among other restrictions required that the number of persons required to drive a steam bus be increased to three, that a man precede the vehicle with a red flag and that the speed be reduced to four miles an hour. Self-propelled vehicles being denied the use of the highways, the development of the motor vehicle industry was delayed for some thirty years and all effort concentrated on railroad transportation.

The automobile industry started in the United States in 1895. During the early days it was handicapped by the lack of good roads. It has shown greater progress since the war than ever before, very largely because of the increase in road building. It continues to be somewhat in advance of the highway facilities as is indicated by the congested condition of our highways in many sections of the country.

THE AVIATION INDUSTRY cannot grow at a rapid rate until adequate airport facilities are provided. Air transport companies may be able to provide their own ports. The individual plane owners are not going to be in a position to provide airports for their own use any more than motor car owners are able to provide highways.

The air transport business has already reached a point where if cities will not provide satisfactory ports, the companies would be warranted in providing their own ports. It would hardly seem good business, however, for a transport company to encourage competition by providing airport facilities for private plane owners, some of whom are using the planes for business purposes and others for pleasure, who would be forced to patronize the transport companies if there were no airport facilities for other than transport planes. Without an increasing number of public airports which the private plane owner can use, upon much the same basis as the motor car owner now uses the highways, we can expect that the airplane industry will be called upon to produce larger and larger planes and the demand for small planes for individual owners will be very seriously restricted.



Showing some of the private hangars at the Cleveland Airport. Three are completed and one is under construction

Avery E. Lord ready for work in the cabin of a Fairchild

The First of Two Articles on Airport Economics and Conditions Affecting Airport Design in the Future

Most of the present-day dangers in flying are due to the lack of airports. The ports are not close enough together, and many of them are not large enough. There are still many cities where there is no public port. There is always danger that this condition will give rise to so many accidents that unless the public can be aroused to provide ports it will be aroused to demand legislation that will place unnecessary handicaps on private flying. It is obvious, therefore, that something should be done at once to stir up public sentiment to the point where the necessary airports will become a reality, perhaps an airport every ten miles all over the country.

At the present time, however, airports are used by but a very small percentage of the people. At the end of the last year there was in use one plane for about every 30,000 people. Though there are many indirect bentfits to be derived from airport developments the cost is high, and it is doubtful if taxpayers, even in the most progressive sections of the country, will continue to be willing to burden themselves with the bigger and bigger bond issues that will be needed unless these ports can show a substantial financial return. If a way can be found to make them fully self-supporting and to provide a sinking fund that will eventually retire the bonds, even the most conservative communities will hardly hesitate to provide all the airport facilities required.

The airport situation is not unlike the highway situation when the country was sparsely settled. In those days the sections of the country which provided the best highways were usually those where toll-roads were most frequent. The users of these roads provided an income which went at least part way toward paying for the maintaining and perhaps the construction of the highways. The advantage to the public of good highways became more and more apparent, and it became easier and easier to secure the funds needed for extending and improving the highway system.

The toll system on highways, however, instead of being discarded has been changed in nature. Through automobile registration fees, drivers' licenses, property taxes on the cars and gasoline taxes the tolls are collected. We have public highways, but we have practically no free highways. In practically every state, each time a motorist stops at a filling station for gas, he pays a road toll.

Thus far, public airport development has been on a far more generous basis than has been the development of highways. The very prodigality with which a few cities have spent money has had a deterrent effect upon others, and we have seen some city governments voting against providing any public airport. The cost of airport development is also becoming higher, which also makes cities hesitate.

An analysis of the situation indicates that the average city must buy larger areas of land than many cities have bought in the past. The larger the area, within reason, the greater the certainty that the city will eventually receive back, not only all the development and maintenance as well as the operating costs, but perhaps also the original cost of the land. The larger the area of the land, however, the larger will have to be the bond issue, and unless a direct revenue can be secured from the very start it may not be possible to obtain as large a bond issue as is required.

The public money can be made to develop a larger and better airport if none of it is used in providing buildings. Therefore it seems wiser to buy the land and lease it to private enterprise than for the city to attempt to provide hangar and other facilities of this general type. The government has seldom been very successful in conducting business enterprises. This is especially true where the undertaking is in a new and rapidly changing industry. Municipal electric light and gas plants have rarely proved successful, and there are comparatively few of them left in this country.

JUST AS SOON as the city begins to build hangars and other buildings it begins to get into business. It is also in a business where the changes are rapid. New buildings may be required on short notice with no money available for constructing them. It may be necessary to go to the public with a bond issue, and this may require months or a year or more. In the meantime the increased business at the port dependent upon the new buildings is lost.

For such reasons as these, and in order to realize the greatest possible income from the port, it is important that the public funds be used for no buildings at all if private capital can be found that will provide them. In

the case of exhibition halls and passenger terminals it may be necessary for the city to erect the structures, but for practically all other buildings private capital can usually meet the situation much better than the city can.

Public funds, then, need to be confined to the purchase of the land, the development of the landing area, and the provision of the lighting system. In other words, the public money should be spent only for those things which are required by all those using the port.

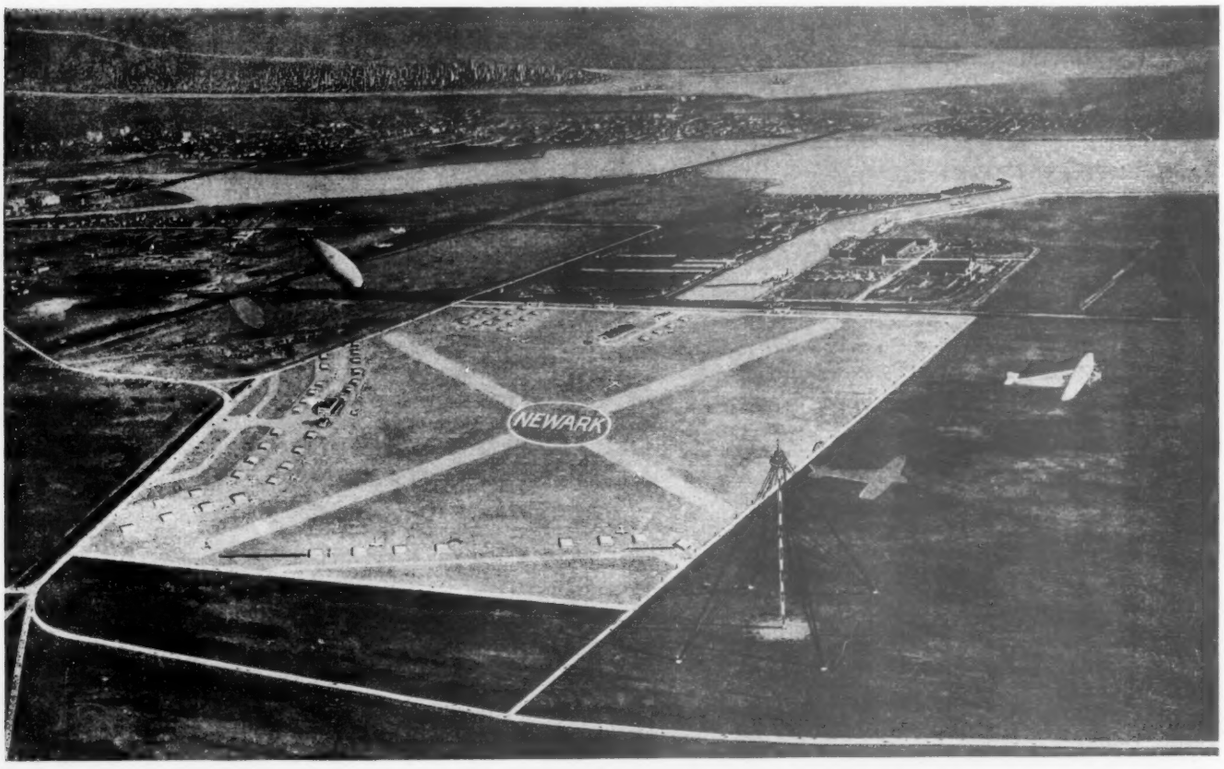
As there are no standard methods of airport accounting and in some cases and at some ports items may be charged as certain costs which are not so charged at other ports, accurate comparisons between different ports can hardly be made. Yet it is probable that no public airport is as yet actually meeting expenses, to say nothing of showing a net operating profit. This has been partly due to the fact that so many ports have been built for the purpose of attracting an air transport line or to secure airplane factories. Aviation now has reached a stage, however, where engineers are making estimates that promise a net profit on the first year's operation of a port.

A survey made by the Austin Company of Cleveland at Jamestown, N. Y., contains the following statements. A site of 230 acres is advised. The land will cost $34,000, the construction of the airport, including runways, hangars, lighting facilities, etc., will cost $111,000. The revenue during the first year is estimated at $23,000 and the cost of operation and maintenance at between $10,000 and $12,000. A profit to apply on the bond issue of $11,000 is indicated. As the bond issue is $150,000 this would be a return of slightly over 7.3 per cent, or enough to pay interest, and if they are 5 per cent bonds to retire the entire issue, even if there were no increase in net return, in less than thirty years. In practice this most certainly would be a very satisfactory condition of affairs.

NEWARK, N. J., has applied to its airport a system that has worked well in its harbor development. It has bought and filled marsh land at a total cost, after a fill of eleven feet, of about $10,000 an acre. For leasing purposes it is valuing this land at $30,000 an acre and making leases at an income of 10 per cent on this basis. Newark also charges for the use of the port ten per cent of all revenue from sight seeing, taxi, and school fees. Two cents a gallon is collected on all gasoline sold at the port. Air mail companies pay a cent a pound for all mail carried, and a cent a pound is collected for all express and freight. A fixed charge is provided for each passenger carried by the transport companies.

The first seven months of operation on this basis have shown the following results: Income, $19,541.49. Expenses, $23,506.57. The income has come from: leases $2,258.30; hangar space $7,290.70; ten per cent tax on passenger flights $6,055.85; automobile parking $2,960.24; receipts from mail companies $596.64. The cost of operation has shown an upward trend since the port was opened October 1, 1928. These expenses are: October, $220.65; November, $1,218.90; December, $1,218.94; January, $2,682.31; February, $5,224.87; March, $7,274.52; April, $5,660.38.

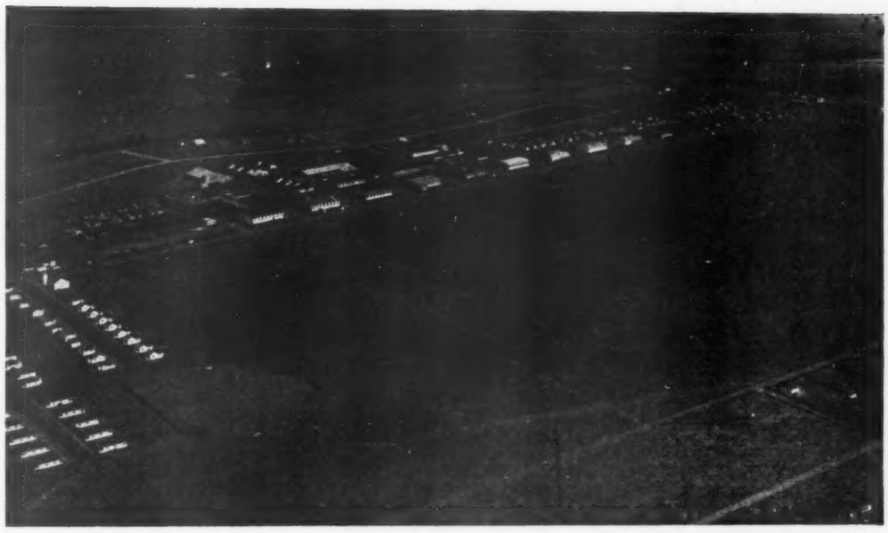
Complaints have been made that the charges at Newark are too high, and there is a possibility that they will have to be reduced or at least some changes be made in the schedule in order to hold the present business and to attract more. However, the general system has already worked well in the port development. The first com-



An artist's conception of the Newark Airport as it will look when completed. Construction at this port has been going forward at a rapid rate. The Newark port is one of the first to grade levy charges according to a real idea of what its total investment should yield in returns.

mercial steamship to leave the port did so in 1922. In 1928 the traffic had grown to 700 sailings and arrivals a year, the handling of 16,000 carloads of inbound and outbound freight, and 75,000 truck operations. The total income from rentals and dockage five years ago amounted to only $40,000. The total revenue from the port in 1928 was $166,000.

As the deficit for the first seven months of the operation of the airport was only $3,965.08, or about 8.3 per cent of the total operating costs, it is obvious that if the income grows at the rate the income of the Port of Newark development has, and if the present system of making charges is not changed, the airport is surely going to show a net profit.



Air view of Love Field, Dallas, Tex. Private capital invested in equipment amounts to more than $1,000,000

When the Newark airport is completed it will cover 420 acres. It will be divided into zones for various types of flying. One zone, having hard-surfaced runways, will be reserved for mail and passenger transport planes. One zone will be reserved for air schools. The National Guard will have an Air Squadron zone. There will be a sight-seeing zone. In addition to the landing area there will be other land from which revenue will be derived. A strip of land 400 ft. deep and 4,000 ft. long parallel to the new State highway will be reserved for some future use not yet determined. Fifty acres on the eastern edge of the airport will be reserved for use by manufacturers of airplanes and equipment.

CLEVELAND has one of the busiest airports in the country. It has an area of 1,000 acres available, 440 of which were already developed at the beginning of 1929 and the remainder of which it is expected will be developed before the end of the year. It has three municipal hangars and eleven private hangars. With but 4,000 planes arriving and leaving the port in 1925, the traffic increased at such a rate that 17,600 planes used the field in 1928. Cleveland is rapidly reaching a point where the port promises to show a good operating profit.

A rental of $1,000 a year is charged for a unit of space for the erection of a hangar, reasonable charges are made for the use of the municipal hangars, a pro-rata charge is made for night lighting to the planes using it. There is a small landing charge.

Buffalo, N. Y., is another city that has given a great deal of attention to airport development and is now working out plans which will place the port on a paying basis. At present revenue is derived from the sale of gasoline, oil and supplies, the rental of buildings and the service of mechanics. The new plans call for the leasing of land for building purposes. If the land is valued at $1,000 as a fair value, it will be leased at $200 an acre. The city will construct streets or taxi ways, sewer, water and light facilities and those who hold leases will be taxed on a foot-frontage basis to maintain these utilities. Clauses in the leases will enable the city to regain possession of the land at any time it is required for the extension of the port. The sale of gasoline, oil, storage, and mechanical service is made possible at the Buffalo airport through the establishment of a revolving fund of $5,000. The money spent from this fund must be replaced through sales, and as a profit accrues additional supplies in quantities are laid in and prices reduced.

At Dayton, Ohio, airport revenues are derived from the following sources. Hangar charges are from $2.00 to $6.00 a night per plane. The minimum charge is $2.00, and this holds for a plane up to 35 ft. Up to 41 ft. the charge is $2.50. From that up for a single-engined plane the charge is $3.00, and for three-engined planes the rate is $6.00. These charges include assistance in bringing the plane in and out of the hangar and other minor service. The monthly hangar charge is based approximately on $1.00 per foot of wing span. Special rates may be given for ships with folding wings. An approximate advance of five cents a gallon over the tank-car rates for gasoline is charged, and a corresponding rate for oil. There is a charge of $1.00 an hour for unskilled labor and $2.00 an hour for skilled labor working on all ships. Other revenues come from the concession stand operated by the port, from service and the like.

These examples indicate how great the variation is between ports that are striving to gain revenue enough to meet operating expenses and perhaps create a sinking fund to retire bond issues. Some ports have not yet made any definite plans for securing revenue. In Montgomery, Ala., a somewhat novel system is being tried out. The city has purchased 1,526 acres of land. Of this 926 acres are to be used for the airport. The remaining 600 acres, which are on three sides of the port, are to be developed into a public golf course. It is reasoned that though the golf course brings no direct revenue to the city, the fact that it is becoming customary for cities to have public golf courses and that so many people will use this course will tend to make the taxpayers willing to stand the cost of development of the site as a whole. At any time the land is needed for airport purposes it will be available. For the operation of the port there is a million-dollar corporation financed with private capital, but with city officials on the board of directors so that policy can be controlled. This is an adaptation of a method now sometimes used to control public utilities.

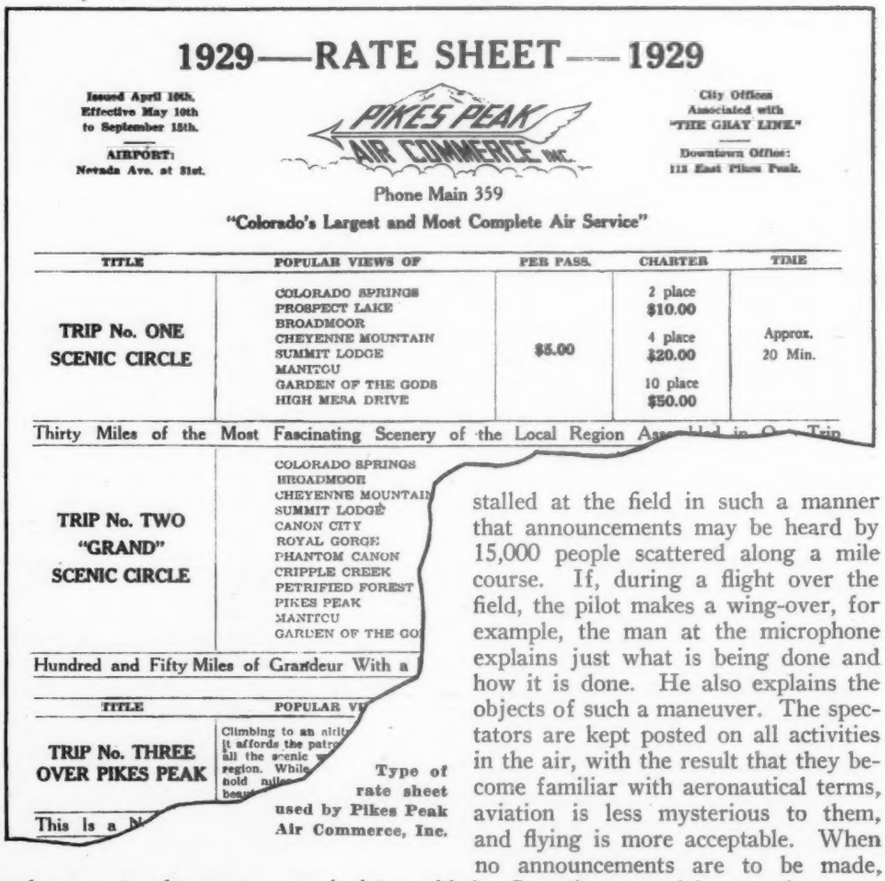
Showmanship IN SCENIC AIR

By Willis Parker

WHILE aviation has not reached a point where airplanes, flyers, parachutes and other aeronautical accessories and activities have become commonplace, nevertheless a little "showmanship" is still advisable in connection with the operation of air service, particularly that dealing with passenger hopping, scenic tours and taxi service. Human nature craves the spectacular, and human nature must be satisfied.

Illustrative of showmanship and its practicability as a selling force, consider the experience of Pikes Peak Air Commerce, Inc., Colorado Springs, Colo., which offers scenic tours, taxi service, a flying school.

Perhaps the characteristics of business in the Pikes Peak region account partly for the methods used, since the community is a summer resort and the prosperity of its citizens depends largely upon the quality of the entertainment offered tourists and the tourists' enthusiasm for it. The visitors expect showmanship, and are not adverse to hearing the selling talks of those conducting scenic tours by automobiles, burros, or on foot. They are thus in a frame of mind to consider favorably the idea of scenic air tours.



1929—RATE SHEET—1929

Issued April 10th. Effective May 10th to September 15th.

AIRPORT: Nevada Ave. at 31st.

PIKES PEAK AIR COMMERCE, INC.

City Offices Associated with "THE GRAY LINE"

Downtown Office: 113 East Pikes Peak.

Phone Main 359

"Colorado's Largest and Most Complete Air Service"

TITLE	POPULAR VIEWS OF	PER PASS.	CHARTER	TIME
TRIP No. ONE SCENIC CIRCLE	COLORADO SPRINGS PROSPECT LAKE BROADMOOR CHEYENNE MOUNTAIN SUMMIT LODGE MANITOU GARDEN OF THE GODS HIGH MESA DRIVE	$5.00	2 place $10.00 4 place $20.00 10 place $50.00	Approx. 20 Min.

Thirty Miles of the Most Fascinating Scenery of the Local Region Assembled in One Trip

TRIP No. TWO "GRAND" SCENIC CIRCLE	COLORADO SPRINGS BROADMOOR CHEYENNE MOUNTAIN SUMMIT LODGE CANON CITY ROYAL GORGE PHANTOM CANON CRIPPLE CREEK PETRIFIED FOREST PIKES PEAK MANITOU GARDEN OF THE GO			

Hundred and Fifty Miles of Grandeur With a

TITLE	POPULAR VI			
TRIP No. THREE OVER PIKES PEAK	Climbing to an altit... it affords the patr... all the scenic ... region. While ... hold mile... beau...			

This Is a N...

Type of rate sheet used by Pikes Peak Air Commerce, Inc.

Since the opening of the 1929 tourist season, Pikes Peak Air Commerce has made the Alexander Airport, which it uses, the Mecca of thousands of people who visit it every Sunday afternoon to see and hear an aeronautical entertainment program. We say "hear" because music and lectures constitute an important part of the program.

The purpose of these entertainments is to familiarize the public with air travel and air safety. Some aerial acrobatics are provided in order to furnish the thrill that grips the attention of the public. Among them are parachute jumps. These serve to impress upon the spectators the possibility of escaping safely from a disabled airplane if necessary.

A series of loud speakers has been permanently installed at the field in such a manner that announcements may be heard by 15,000 people scattered along a mile course. If, during a flight over the field, the pilot makes a wing-over, for example, the man at the microphone explains just what is being done and how it is done. He also explains the objects of such a maneuver. The spectators are kept posted on all activities in the air, with the result that they become familiar with aeronautical terms, aviation is less mysterious to them, and flying is more acceptable. When no announcements are to be made, music is provided. Sometimes special entertainers are employed. For example, two Orpheum vaudeville entertainers performed recently.

Behind all of this showmanship is the effort to sell what the company has to offer—scenic air tours, taxi service, ten-minute hops, and the flying school.

SERVICE, of course, must back up the entertainment. Somewhat analogous to the service offered by automobile companies in the region, which have for a number of years opened highways to interesting scenic points in the region, Pikes Peak Air Commerce offers similar trips and books them much in the same manner that automobile trips are booked through the travel agencies in various parts of the country.

At this point we might pause to remark that the company has experienced no difficulty in working with automobile transportation lines. It is true that there is some competition, but the motor lines agree that if a tourist wants an air ride, he is going to have it, and likewise if

TOURS

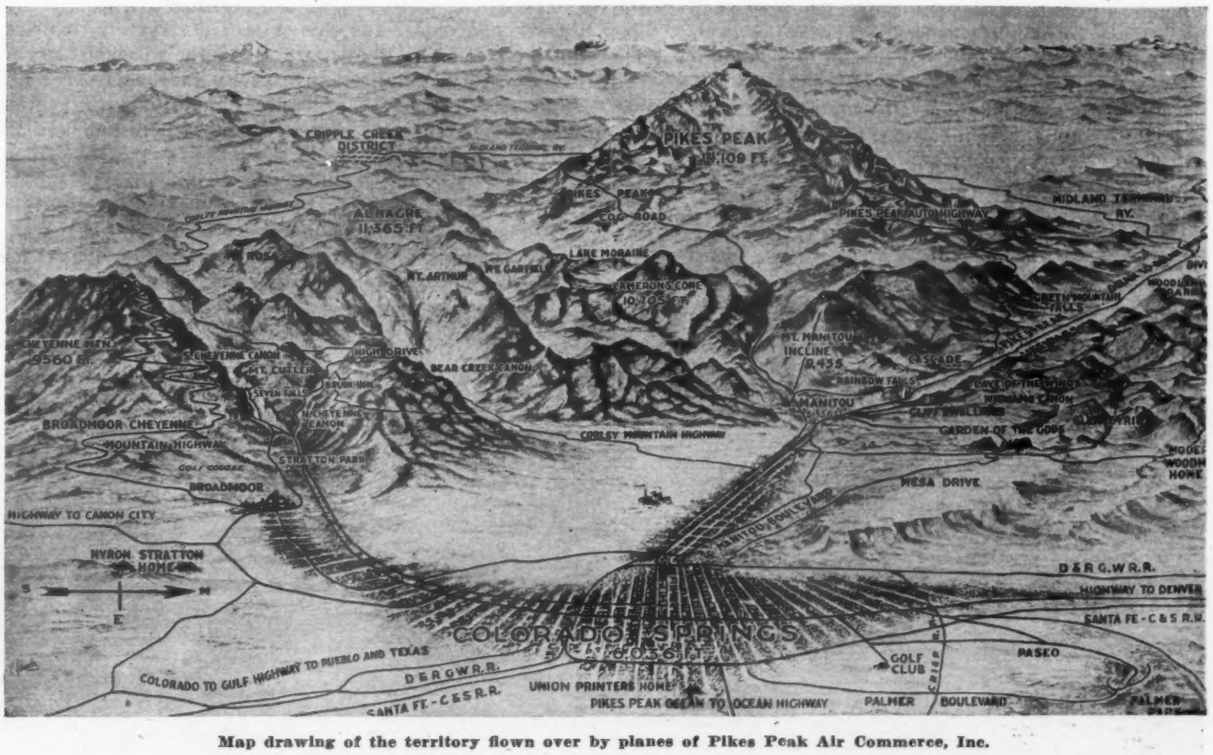
Joy-riding for a thrill is giving way to aerial sight-seeing as the mainstay of many operating companies. Passengers go for the view, not merely to see what flying is like. The plan here described, of having an automatic route indicator to replace the "barker" on a sight-seeing bus, has interesting possibilities for increasing the attraction of the scenic tour.

he wants an automobile trip, he will have that. So well do the two lines of transportation work together that the aviation company has uptown offices in the same room with the Gray Lines, who operate scenic automobile tours in the region.

Before the tourist season opened, the company prepared rate sheets covering several special air trips from Colorado Springs, and distributed them to more than 1,200 booking agencies in the country. The prospective Colorado Springs visitor may step into a ticket office in Chicago, for example, arrange a tour of the West, including a stop at Colorado Springs, be booked for a trip via the air on one of the three tours offered by the company, and pay for it with the rest of his ticket. When he arrives in Colorado Springs, he takes his flight if weather permits while he is in the community. If weather conditions are not right for flying, his money is refunded while he is still in Colorado Springs, before he continues his railroad journey.

"If the visitor is to stop in Colorado Springs only long enough to take an air flight, we meet him at the train with an automobile, and take him to the field," explained Chase Stone, vice-president of the company. "He is given his air trip and is delivered by automobile to the station where he boards his train and continues his journey. If the visitor is staying a few days at Colorado Springs, we meet him with an automobile at his hotel and return him after the flight. No extra charge is made for this accommodation."

Showmanship is important in conducting the tours, since the visitor must be given information concerning the points of interest as the plane is passing over them. However, it is not practical thus far to make these announcements verbal, so the company is arranging to have visual announcements on a roll of canvas similar to the rolling contrivance on street cars which permits changing the name of the route by the simple turn of a crank. It is planned, according to Mr. Stone, to have the roll move through the reading aperture by a clock-like arrangement which will be synchronized with the air speed of the plane, and as the plane approaches a certain scenic point the name of that point, together with a short description of it, will move into the passenger's view.



Map drawing of the territory flown over by planes of Pikes Peak Air Commerce, Inc.

Legal Responsibilities OF CARRIERS OF

IT IS WELL KNOWN among law experts that the majority of legal controversies may have been avoided had the parties known the elementary principles of the law.

Obviously, all persons cannot obtain dependable knowledge of all branches of legal procedure, and at the same time prove adept in their own business or profession. However, when it is considered that the average person interested in aviation is subjected to the pitfalls of litigations arising from comparatively few sources, it is easy to realize that acquiring sufficient legal knowledge to successfully avoid the majority of controversies is not difficult.

Obviously another advantage of obtaining reliable legal information in simplified form is knowledge of legal rights. Certainly, a person who understands his legal obligations is less likely to perform acts that will result in liability, when compared with a person who is unfamiliar with the law, or one who relies upon "hearsay" information which, in the majority of instances, is quite undependable.

The difference between a common carrier and a private carrier is that the former hauls merchandise for any and all persons or transports all persons who apply, whereas a private carrier transports goods exclusively for himself or *one or two special persons or firms.* The law with respect to the liability of a common carrier applies to any firm or person such as an aviation corporation, an expressman, a railroad, a motor truck transportation company, an express company, a warehouse company, or any similar firm which transports passengers or merchandise.

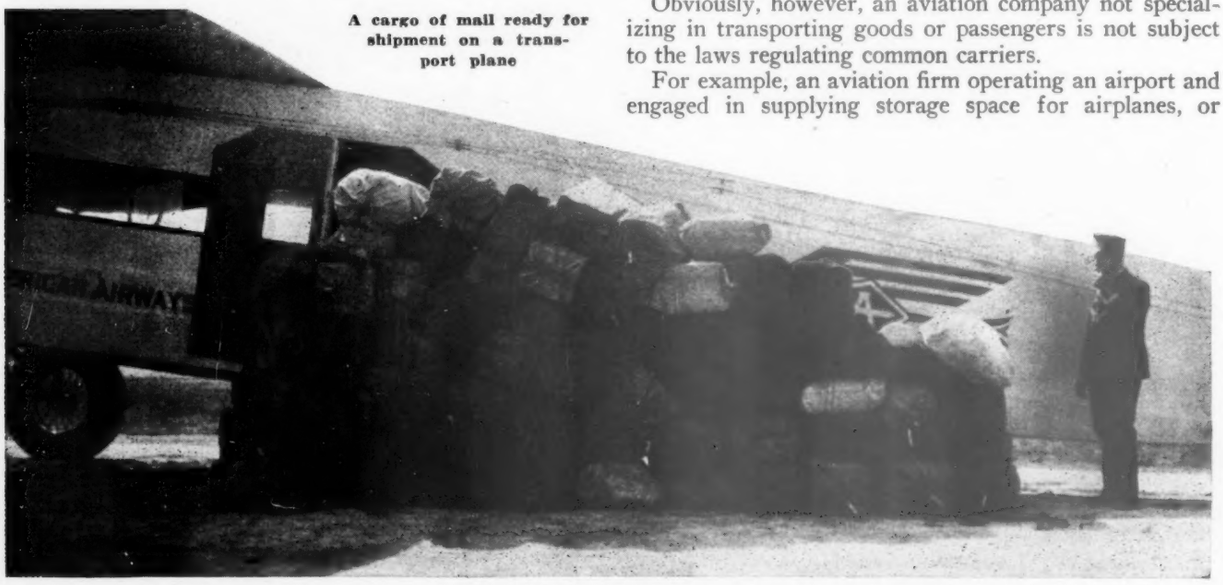
At present, the law is well established that a common carrier is practically an insurer of the safe arrival of goods and hand baggage which it accepts for transportation. In fact, the carrier is liable for *all* loss resulting from its own negligence, and against all other loss or damages, except such as may be caused by the *act of God, a public enemy of the United States, the act of the shipper, or the inherent nature of the goods.* Moreover, although the damage is due to one of these causes, the carrier still is liable for any damage which may result by its failure to exercise reasonable care to protect the shipment from such loss or damage.

Of course, some distinction is made between the liability of a common carrier of perishable and non-perishable goods. In the recent case of Philadelphia v. Diffendal, 109 Md. 494, the Court explained the character of liability of a common carrier of perishable goods,

"The ordinary common-law liability of a common carrier, as to most commodities committed to its custody for transportation, is that of an insurer against all risks incident to the transportation, save such as results from the act of God, or the public enemy, or the fault of the shipper, but with respect to perishable goods, which themselves contain the elements of destruction occasioning their own loss or deterioration, the carrier is not an insurer, but is required to exercise *reasonable care and diligence* to protect the goods from injury while in its custody as well as to deliver them with dispatch to the consignee or connecting carrier."

Obviously, however, an aviation company not specializing in transporting goods or passengers is not subject to the laws regulating common carriers.

For example, an aviation firm operating an airport and engaged in supplying storage space for airplanes, or



A cargo of mail ready for shipment on a transport plane

By LEO T. PARKER
Attorney at Law

GOODS AND BAGGAGE BY AIR

Goods and mail stored aboard the plane

transporting mail, or having contracts to transport goods for one or two firms is not deemed a common carrier and, therefore, is liable only as a private carrier, whose legal duty simply is to exercise ordinary care to safeguard persons or merchandise being transported.

IF, HOWEVER, a mail carrier, for instance, holds itself out to the public as being willing to transport merchandise for any and all persons, or ready to transport passengers over the regular mail route it would be governed by legal rules and laws relating to common carriers.

For instance, in a very recent case, Burnett v. Riter, 276 S.W. 347, a higher Court said:

"A common carrier is one who is engaged in the transportation of persons or things from place to place for hire, and who holds himself out to the public as ready and willing to serve the public indifferently, in the particular line in which he is engaged. . . . The real test of whether one is a common carrier is *whether he holds himself that he will, so long as he has room,* carry for hire persons or goods brought to him for that purpose."

Still another important point of the law is that a private carrier cannot be converted into a common carrier by State laws. For illustration, in Purple v. Campbell, 250 Pa. 213, a State law was enacted which was intended to convert private carriers under the regulations and laws relating to common carriers.

However, it is interesting to observe that the Court held the law invalid, quoting (46 S. Ct. 605) as follows:

"That, consistently with the due process clause of the Fourteenth Amendment, a private carrier cannot be converted against his will into a common carrier by mere legislative command, is a rule not open to doubt, and is not brought into question here. . . . There is involved . . . the power to compel a private carrier to assume against his will the duties and burdens of a common carrier, the State does not possess."

The rule is well settled that if merchandise or baggage is delivered to a common carrier in good condition and the shipment arrives at its destination in a damaged condition, a *prima facie* case of liability against the carrier exists. In order for the common carrier to avoid liability it is bound to prove that the damages did not arise from its negligence. However, the shipper or owner of the goods must prove in Court that he delivered the goods to the carrier in good condition, and that it was delivered by the carrier in a damaged condition.

It is well established that a common carrier may limit its liability for damage to goods caused by its negligence, *only where the contract is based upon a reduced rate.* (114 So. 680.)

However, a carrier is not relieved of liability for damages to goods or hand baggage as a result of its negligence, where the contract simply *limits* the amount collectible and the rate is not reduced.

For instance, in Kiltham v. International, 157 N. E. 267, a Court said:

"The rule is well established . . . that a common carrier may limit its liability for damages caused even by its own negligence, if the parties agree that recovery shall be limited to an agreed valuation *which forms the basis of the charges fixed by the carrier, or where limitation is the consideration for other benefit to the shipper.* . . . Here the agreement that liability shall not exceed the invoice value of the goods *did not* result in a reduction of charges to the shipper. Limitation imposed without choice of rates between limited and unlimited liability is not valid. . . . Here the effect of the valuation clause is solely to limit liability. If market value at place of destination should prove less than the invoice value, the shipper could not under its terms recover larger damages. It provides no new measures of damages of which either party may claim the benefit, it leaves the usual measure of damages unaffected except that the damages so measured may not exceed the involce value or its proportionate part in case of partial loss or damage."

The most recent higher Court case involving this subject is Coos Co. v. American Ry. Express Co., 277 Pac. 107, decided during the past few weeks.

In this case it was disclosed that a shipper of merchandise via express, signed a "uniform express receipt"

TACOMA PUBLIC LIBRARY

in which he declared the valuation of the goods at $50 and which contained the following clause:

"In consideration of the rate charged for carrying said property, which is dependent upon the value thereof and is based upon an agreed valuation of not exceeding fifty dollars . . . unless a greater value is declared at the time of shipment, the shipper agrees that the company shall not be liable in any event for more than fifty dollars for any shipment. . . . Unless a greater value is declared and stated herein the shipper agrees that the value of the shipment is as last above set out and that the liability of the company shall in no event exceed such value."

The carrier failed to make delivery of the goods and the consignee sued the carrier for $237 damages which he sustained as a result of not receiving the shipment.

The carrier contended that its liability should not exceed $50, because it had based its rates for transportation upon the reduced valuation. The consignee argued that since he had not signed the receipt, he was not bound by its terms and, therefore, was entitled to collect full damages.

However, it is interesting to observe that the Court held the consignee bound by the reduced valuation agreement *signed by the consignor,* and held the carrier liable for only $50 damages, saying:

"The sole question for consideration is whether the receipt or bill of lading issued by the express company and signed by the shipper determines the extent of liability for failure to deliver. . . . When a shipper delivers a package for shipment and declares a value, either upon request or voluntarily, and the carrier makes a rate accordingly, the shipper is estopped upon plain principles of justice from recovering, in case of loss or damage, any greater amount."

On the other hand, various higher Courts have held that where a passenger accepts a check, having printed thereon a notification that the carrier's liability for loss of baggage is reduced, and the latter's employees fail to direct the passenger's attention to the notice, such passenger is *not* bound by the printed notification. (108 So. 414.)

However, a contract is valid by which the passenger signs an agreement that his baggage is being transported with the understanding that should it be lost or damaged the carrier's liability shall not exceed a stipulated amount, unless the passenger pays an additional fee to increase the risk assumed by the carrier.

IT IS WELL to remember that an aviation company's liability automatically is changed after the owner receives notification that the merchandise or baggage, transported under common carriers' laws, is ready for delivery and the owner fails to promptly accept the shipment.

In other words, after an owner has been notified by the common carrier to call for the shipment, or the owner knows his baggage has arrived at its destination, the carrier is liable for loss or injury to the same, only where the damage is occasioned *by want of ordinary care* on the part of its employees.

For example, a common carrier that stores merchandise or baggage in its warehouse is not liable for the loss or injury to the shipment caused by fire, theft, floods, or other causes, unless it is proved conclusively that the loss resulted by failure of the carrier to employ a competent watchman, or efficient equipment, or experienced employees, or performed or failed to perform some other act which negligently caused the loss.

Generally, a common carrier's liability as an insurer remains unaltered by an act on the part of the former's employees by which the owner of the baggage is deceived.

For example, in a leading case it was shown that a person purchased a ticket and checked his baggage for transportation. At this time he was told by the carrier's agent that the vehicle in which he intended to ride would leave in 30 min. Thereupon, the individual left the port and upon his return 25 min. later he found that the vehicle had departed. His baggage, however, went forward and was deposited by the carrier at its terminal which burned the next night, and the baggage was destroyed by the fire.

This Court, in holding the carrier liable, explained that a common carrier's liability, as an insurer for the baggage of a passenger, continues until the passenger has been given a *reasonable* opportunity in the exercise of diligence to remove it. This Court also said that after a reasonable time and opportunity has been afforded the passenger to accept delivery of his baggage, the liability of the carrier is reduced to that of "ordinary care."

THE EXACT MEANING of the term "ordinary care" has been the chief discussion of numerous litigations. For instance, assuming that an aviation firm occasionally transports passengers and, therefore, is a legal private carrier, because it does not hold itself out to the public as being ready and willing to transport all persons who apply for transportation, this carrier is liable in damages for injury to the passenger, or loss of his baggage, only where it is proved to the satisfaction of the Court that the injury resulted from lack of ordinary care on the part of the aviation firm's employees.

Just what the term ordinary care means depends upon the particular circumstances of the case. There is no certain rule applicable in deciding all of the various controversies, because the particular conditions and circumstances surrounding each litigation must be carefully considered.

However, a recent higher Court explained that the term "ordinary care" is that degree of care which would have been exercised by a reasonably prudent and careful person under the same circumstances of which a passenger is injured or an article is lost, stolen or damaged.

Considerable loss may be eliminated by a common carrier having printed upon receipts, signed by the owners of the baggage, that the carrier's liability shall be decreased to that of "ordinary care" after the transported merchandise or baggage has remained in the carrier's terminal 48 hours. Thus the common carrier's usual liability is automatically limited to that of a private carrier.

It has been held that the term "baggage" includes all wearing apparel and other *necessities* of the traveler.

For instance, where a jewelry salesman checked a case containing valuable jewelry, the Court held the carrier not liable for its loss because it was not legal "baggage."

In another case where a passenger carried in his pocket one watch and checked a bag containing another watch, he was not entitled to recover the value of the watch in his lost bag because only one watch is considered a necessary part of a traveler's apparel.

The same law is applicable with respect to merchandise belonging to another person, which a traveler checks as his own baggage. For example, in a leading case (229 Pa. 266) a higher Court held that where a passenger checks the property of another person and the same is carried by a common carrier as baggage, the latter is liable to the actual owner only for loss or damage occasioned by *gross negligence or wilful conduct.* This is true because a carrier owes no duty to the owner of baggage who is not a passenger.

Cliff Henderson, managing director of the Western Aircraft Show

THE *Western* AIRCRAFT SHOW

California Air Tour and All-Western Airport Conference To be Held in Conjunction with Exposition

By CHARLES F. McREYNOLDS
Pacific Coast Editor of AVIATION

SEVERAL FACTORS have combined to lend more than usual interest to the staging of the 1929 Western Aircraft Show at Los Angeles, from November 9 to 17 inclusive. Unlike previous sectional shows sanctioned by the Aeronautical Chamber of Commerce, the Western Aircraft Show has been underwritten by that body and is being staged by the Aeronautical Expositions Corporation, under the direction of Cliff W. Henderson, and with the support of the local organization, the California Aircraft Exposition Association, a representative, non-profit group of California aeronautical executives. Because this is the first sectional show to be actively managed by representatives of the Aeronautical Chamber of Commerce every effort is being made to stage a show which will prove profitable to both exhibitors and sponsors. By establishing such a precedent the industry will more readily endorse the plan of having all future sectional shows underwritten and managed by the Aeronautical Expositions Corp. branch of the Aeronautical Chamber of Commerce of America.

Another important angle to the present Western Aircraft Show is that it come at a time when a condition of overproduction is prevalent in the industry and a real sales campaign is needed to dispose of surplus stocks of aircraft. While flying operations are being curtailed in the east, the west presents an all-year flying territory with the possibility of a mid-winter show producing all-year sales.

Aside from the present condition of overproduction it will be profitable for the industry to develop a strong winter market which can be relied on year after year to reduce the seasonal sales slump.

From the locals viewpoint interest in the Western Aircraft Show has been increased by a desire to place this one yearly mid-winter show in the Southern California territory permanently and it is felt that a marked success this year will result in an annual winter show here just as the big annual spring show is yearly held in Detroit. Los Angeles civic and aeronautical bodies are working to establish this show as a yearly "Southern California" event rather than having it gravitate to other western, or southern centers of interest.

Again from the local angle, Los Angeles interests see in the present condition of the industry an opportunity to see the merits of this territory to manufacturers not yet permanently established. It is felt that after another six months the industry will have crystallized and any sectional advances hoped for must be made before that time.

For all of the above reasons the Western Aircraft Show has stirred up interest far beyond the ordinary sectional event. The industry sees here an opportunity to sell an unexpected surplus in what is conceded to be the world's most fertile aircraft market, and western civic interests recognize an opportunity to sell sectional advantages to a still fluid industry. The result is a great sales campaign which is far more than just an aircraft show. In addition to the Western Aircraft Show, Nov. 9 to 17, there is being held the California Air Tour, Nov. 4 to 7 inclusive; the All-Western Airport Conference, Nov. 7-8-9; and Air Week, Nov. 9 to 17, held in conjunction with the show and calculated to generate wide public interest in aeronautics generally.

Fortunately for this program the Los Angeles Junior Chamber of Commerce, an organization of approximately 1,000 of the younger business men of the city, has dedicated the major effort of the entire organization for the year 1929 to the promotion of Los Angeles' aviation development. As a result the California Air Tour and Air Week were both suggested and are being sponsored by this body and the great burden of publicity work in connection with the show itself is being handled by this group.

WITH 50 ENTRIES filed two weeks before the start of the tour the entry list has been limited to 60 planes and there is little doubt of the success of the California Air Tour. Fifty machines are already entered, representing nearly 30 makes. The Travel Air leads with eight entries. So far as the show is concerned the tour's chief

value will be in stirring up state-wide interest and publicity tending to turn all eyes upon Los Angeles for the show. In order to capitalize this publicity to the fullest extent provision has been made to carry 12 newspaper reporters on the tour, all representing papers printed in Los Angeles or the adjacent cities of Long Beach, Santa Monica, Glendale, or Pasadena, from which population centers the show attendance must be drawn. In addition a movie news reel crew is being carried to record the tour for both local and national news reel release.

As an aid to general aeronautical progress and the stimulation of aviation development and aircraft sales throughout the state a corps of public speakers will be carried on the tour to address Chambers of Commerce and civic bodies in the towns where stops are made. Towns flown over but not stopped at will be treated to broadsides of booster pamphlets thrown from the tour planes and urging the development of adequate airports and the participation in western aviation progress.

Starting on Nov. 4 from the Los Angeles Metropolitan Airport, the tour will touch at Santa Maria, Salinas, San Francisco, Oakland, Sacramento, Stockton, Fresno, Visalia, Bakersfield, San Bernardino, Riverside, San Diego, and return to Los Angeles Municipal Airport on Nov. 7 after covering approximately 1.500 mi. in a little less than four days.

In addition to the civic activities being conducted along with the tour, it will serve as a flying exposition of all types of aircraft for those unable to come to Los Angeles, and each distributor entered will make every effort to list prospects and make sales during the tour.

The All-Western airport conference, sponsored by the Aeronautical Chamber of Commerce as a means for bringing aviation executives to the scene of the show, will open on Nov. 7, the day that the state air tour ends, and will last through Nov. 9, the Aircraft Show opening date. The keynote address for this conference will be given by Col. Harry H. Blee, Chief of the Division of Airports and Aeronautics Information, United States Department of Commerce, and papers will be presented by leading western airport executives at the various conference meetings. So far as the show itself is concerned, the holding of this conference assures to equipment distributors exhibiting a concentrated market at the scene of the show. Since airport executives are also interested in aircraft sales this group brought together by the Airport Conference will prove a valuable point of contact for all exhibitors of planes, engines, and accessories.

THE "AIR WEEK" program, while quite simple, is nevertheless original and holds promise of greatly boosting popular interest in both the show and aviation generally for the entire period of Nov. 9 to 17 and for one week before and after. All Southern California operators have agreed to a plan by which anyone presenting a ticket stub from the Aircraft Show will be given a $2.50 scenic ride for $2.00, a reduction of 20 per cent, and all persons purchasing a $2.50 ride will be given one ticket to the aircraft show, free of charge, or two tickets with a $5.00 ride. Starting one week before the date for the show to open the operators will give show tickets with scenic rides and extending for one week after the show closes the operators will honor show ticket stubs as partial payment on scenic rides, so that, according to present plans, the "Air Week" will really amount to three weeks of what is hoped will prove a greatly increased volume of scenic flying. At the same time it is believed that the granting of Show Tickets to patrons of the aircraft operators will kill three birds with one throw, increasing air traffic, increasing show attendance, and bringing to the show those people who are interested enough in aviation to have gone out and paid for a flight and who will come to the exhibition of aircraft with fresh interest and enthusiasm for things areonautical.

William J. Bonelli, Director and attorney of the California Aircraft Expositions Corp.

Fred A. Worthy, sales manager of the Axelson Machine Co., Aircraft Division and President of the California Aircraft Exposition Corp.

The Western Aircraft Show itself, under the direction of Cliff Henderson, is being made a straight "sales" show in every possible way. There will be no outside activities, no air races, or close at hand airport operations to distract show audiences, the air tour and airport conference, both finishing before the show get under way, being calculated to greatly assist in directing attention toward the aircraft show.

Three weeks before the date for the show opening approximately 90 per cent of the available 100,000 sq.ft. of floor space has been reserved, and the list of exhibitors is representative of the entire industry. In addition to the active direction of Cliff Henderson the show has the actual support of the entire local industry as represented by the board of directors and officers of the California Aircraft Expositions Association, and the utmost co-operation has been evidenced everywhere by members of the aviation industry.

A special exposition building has been erected on the corner of Fairfax and Wilshire Blvd's in an ideal location for exhibitors because of the many airports close at hand and good boulevards which make it possible to tow any airplane of not over 60 ft. wing spread directly into the show building from the field without dismantling. From the standpoint of the show patrons the location is almost exactly in the center of population of the Los Angeles Metropolitan area, and is the most accessible spot so far as boulevard facilities are concerned, in all Southern California. The show building, 250x400 ft. in size, has been built especially for the display of airplanes and provides wide, unobstructed areas for the proper placing of the planes without crowding. By locating the show on a comparatively undeveloped tract of land the parking problem for show patrons has been eliminated and more people can be expected to attend than if the show were in a downtown or close to downtown location.

One factor which should greatly aid actual sales dur-

ing the show is the fact that there are 15 good airports within a radius of little more than five miles from the show building, and it will be possible for exhibitors to take live prospects directly to the airport for a demonstration ride, provided, of course, that a demonstrator plane is available in addition to the plane or planes on display.

IN ADDITION to the customary newspaper publicity and bill board advertising an intensive publicity campaign with a strong civic flavor has been carried out by the Los Angeles Junior Chamber of Commerce. Committees have been put to work on broadcasting the show program and publicity over the radio and from portable autos equipped with loud speaker units which will visit all small towns in Southern California, the staging of window displays in all leading stores, banks, hotels, depots, etc., the distribution of windshield stickers, auto banners, and hundreds of thousands of envelope insert pamphlets advertising the show which have been sent out through the regular mailing program of Los Angeles merchants co-operating, the organization of a speaker's bureau which is furnishing booster aviation talks to dozens of service clubs and civic organizations, and by the development of a Junior Model Aircraft Show, held within the main exposition building and serving to create much favorable publicity and increased attendance.

Another excellent way in which public enthusiasm for the show has been fostered, is through a contest, staged by one of the morning papers, which features the picture of a different airplane each day for the two weeks preceding the show, and requires contestants to send in short essays on the merits and accomplishments of each plane pictured. Names of the airplanes are not printed and it is necessary for contestants to discover the name of the plane and its manufacturer, enhancing the contest's value as a sales medium for aircraft. To make the contest worth while the following prizes were donated: 1st prize, a flight to Kansas City and return over Western Air Express; 2nd prize, one flight to El Paso and return over Standard Air Lines; 3rd prize, one flight to San Francisco and return over Maddux Air Lines; 4th prize, one flight to San Diego and return over Pickwick Air Lines; 5th prize, same; 6th prize, two tickets for scenic flights conducted by James E. Granger; 7th prize, same; 8th, 9th and 10th prizes, single tickets for flights on the regularly conducted scenic tours of Tanner Air Livery.

It need not be pointed out that as in the above contest, so with the California Air Tour, and the Air Week plan, the operators and distributors of aircraft are going to some expense to make this sales campaign a success. If the campaign for air-mindedness, aeronautical progress, and aircraft sales which is accompanying and tied-up with the Western Aircraft Show, does prove successful it will be because all concerned were willing to work hard, and to spend money to make it so.

Only an incomplete list of exhibitors in the Western Aircraft Show is available as this is written: Among those showing airplanes are: Fairchild Airplane Co., 2 Fairchilds and two KR's; Angelus Aircraft Corp., 4 or more Aeromarine Klemms; Ruckstell Corp., Ltd., 3 or more Great Lakes trainers; Pasadena Aircraft Corp., one Javelin; Moreland Aircraft Co., one Moreland; Douglas Aircraft Co., one army type Douglas plane; Curtiss Flying Service, 4 planes not yet designated; Dr. H. H. Hawkins, one Barling; Crook Co., one Gypsy Moth; H. C. Lippiatt, two Travel Airs; Timm Airplane Corp., one Collegiate monoplane; Parks Aircraft, Inc., two Parks; Joseph Kreutzer, Inc., one Kreutzer; Aero Corporation of Calif., four planes not yet designated; Detroit Aircraft Corp., one each, Lockheed, Ryan, and Eastman flying boat; American Aircraft Corp., two Wacos; Emsco Aircraft Corp., one Emsco "Cirrus" trainer and one Emsco Challenger; Bach Aircraft Corp., one Bach; Bellanca Aircraft Co., one Bellanca. Other aircraft tentatively entered but with space not yet contracted for will more than fill the show building.

Engines: Brownback Motor Laboratories, Axelson Aircraft Engine Co., Kinner Airpane Motor Corp., Dawn Motor Co., Wright Whirlwind engines shown by Pacific Airmotive Corp., and Pratt and Whitmey Wasp engines shown by Aero Corporation of California.

Accessories: Pacific Airmotive Corp., representing Berry Bros., Firestone Airplane Tires, Flightex Fabrics, Standard Steel propellers, Scintilla Airplane Magnetos, Stromberg Airplane Carburetors, Wright engines, Aero Supply Mfg. Co., and Bendix Brakes and Wheels; Western Flying, MacWhyte Co., H. H. Robertson Co., Irving Air Chute Co., Shell Oil Co., Calif. Panel and Veneer Co., Union Oil Co., Goodyear Tire and Rubber Co., Pacific Finance Corp., Pacific Goodrich Tire and Rubber Co., Boothe Co., Calif. Safety Appliance Co., Western Auto Supply Co., Western Aviation Supply Co., Standard Oil Co., Crouse-Hinds Co., Los Angeles Metropolitan Airport, Champion Spark Plugs, McKinnon Flying Publications, Shaw-Palmer-Bakewell Co., Kinner Airplane Motor Corp., Scully Bros., Rule & Son, Bullet Air Cleaner Co., Texaco Co., Nicholas-Beazley Airplane and Motor Co., Harwen Products Co., Air Mechanics Magazine, Aero Digest, Maddux Air Lines, Western Air Express, Pacific Auto Corp., Richfield Oil Co., Pacific Scientific Co., and General Instrument Co.

Partial List of Entries in the California Air Tour

No.	Plane	Type	Pilot	Owner
1.	Travel Air	Open biplane	C. F. Lienesch	Union Oil Co.
2.	Travel Air	Open biplane		Union Oil Co.
3.	Travel Air	Open biplane	M. C. Loutt	M. C. Loutt
4.	Travel Air	Open biplane	F. L. Barnes	F. L. Barnes
5.	Travel Air	Cabin monoplane	H. C. Lippiatt	H. C. Lippiatt
6.	Travel Air	Open biplane		Ed L. Erickson
7.	Travel Air	Cabin monoplane		Ed. L. Erickson
8.	Travel Air	Open biplane	R. S. LeRoy	Axelson Co.
9.	Fairchild	Cabin monoplane	J. B. Alexander	J. B. Alexander
10.	Fairchild	Open biplane		
11.	Great Lakes	Open biplane		Ed. L. Erickson
12.	Aeromarine Klemm	Open monoplane	Earl Gordon	Angelus Aircraft
13.	Sunbeam	Cabin biplane	R. C. Warren	Commercial Co.
14.	Mohawk	Open monoplane		Geo. R. Craig Co.
15.	Fokker	Cabin monoplane		Aero Corp., Calif.
16.	Douglas	Open biplane	Earl Noe	National Guard
17.	Kreutzer	Cabin monoplane		Kinner Co.
18.	Curtiss Robin	Cabin monoplane		Kinner Co.
19.	Fleet	Open biplane		Kinner Co.
20.	Monosport	Cabin monoplane		Kinner Co.
21.	DH Moth	Open biplane		W. D. Crooke Co.
22.	Barling NB3	Open monoplane		H. M. Hawkins
23.	Emsco "Cirrus"	Open monoplane		Emsco Co.
24.	Kari-Keene	Cabin monoplane	John C. Newsom	John C. Newsom
25.	Bach	Cabin monoplane	Pat Fleming	Bach Co.
26.	Stearman	Open biplane	Roy T. Minor	Roy T. Minor
27.	Stearman	Open biplane		Richfield Oil Co.
28.	Fokker F-10	Cabin monoplane		Richfield Oil Co.
29.	Great Lakes	Open biplane		The Texas Co.
30.				Curtiss Flying
31.				Walter Murphy Co.
32.			Gladys O'Donnell	G. O'Donnell
33.	Bellanca	Cabin monoplane	Bob Larson	Hercules Products
34.	Moreland	Open monoplane		G. E. Moreland
35.	Fleet	Open biplane		S. Williams
36.	Golden Eagle	Open monoplane	Jack Helm	Jack Helm
37.	Boeing	Cabin biplane		Standard Oil Co.
38.	Timm "Collegiate"	Open monoplane		Timm Aircraft Co.
39.				Hancock College
40.				Hancock College
41.	Swallow	Open biplane		Bryant G. Hall
42.	Lockheed	Cabin monoplane		Detroit Aircraft
43.	Boeing	Cabin biplane		Boeing Co.
44.	Lockheed	Cabin monoplane		Goodrich Co.
45.	Boeing	Cabin biplane		Associated Oil Co.
46.	Hodkinson	Cabin biplane		Valley Mfg. Co.
47.	Cessna	Cabin monoplane		Cessna Co.
48.				Rogers Airport
49.	Fokker F-10	Cabin monoplane		Rio Grande Oil Co.

GENERAL NEWS

Russian Airmen Land at New York

Left Moscow Aug. 23 On 12,500 Mile Journey

NEW YORK, (N. Y.)—With a flight of 12,500 mi. over land and water behind them, four Russians brought their plane, "Land of the Soviets," to a landing at Curtiss Field, Valley Stream, L. I., on Nov. 1 at 4:13 p.m. Among the throng of 10,000 that greeted the fliers who left Moscow on Aug. 23 for this city, was Col. Charles A. Lindbergh.

The crew, first pilot, Semyon Shestakov; second pilot, Philip E. Bolotov; navigator, Boris V. Sterlingov; and mechanic, Dimitri V. Fufaev, were later welcomed to the city by Mayor Walker.

The men will be guests of honor at a dinner to be given by the American-Russian Chamber of Commerce and the Aeronautical Chamber of Commerce. The speakers at the affair will include Clarence D. Chamberlin, trans-atlantic flier; Albert Ottinger former Attorney-General of the state; Richard B. Scandrett, Jr., vice president of the American Gas and Electric Company and a member of the business group which recently toured Russia; and Saul G. Bron, chairman of the board of directors of the Amtorg Trading Corporation. Chairman of the dinner will be Reeve Schley, president of the American-Russian Chamber of Commerce.

Radio Used to Advantage

On Aug. 8, a crash at Chita in the Siberian wilderness, ended the first Moscow-New York venture, which was started in a plane similar to the one which has just arrived here, and manned by the crew who have successfully negotiated the trip this time.

Sponsored by the Soviet Air Society, "Osoaviakham," the trip was undertaken more as a "goodwill" flight than with the idea of breaking any records. The journey, taking the aviators as it did across sparsely civilized land, gave many natives both in Siberia and Alaska, their first sight of an airplane. Large crowds composed of interested spectators, officials, and Russian representatives, greeted "Land of the Soviets" and its crew at the various cities it touched at on the trip.

Bad weather hampered the aviators more than anything else, holding them some points for many days, while on several occasions, mechanical trouble caused temporary postponement of various legs. As the plane was equipped with a sending and receiving apparatus, the United States Government was able to aid the fliers with weather reports and when the fliers landed at Attu, an Aleutian Island and their first stop on American soil, coast guard men probably saved the trip from ending in disaster, by rescuing plane and men from the waves, following a two hour battle with a gale.

"Land of the Soviets," an all-Russian plane, save for the engines, was built under the direction of A. N. Tupoleff, aviation engineer of the Central Aero Hydro-Dynamic Institute of the U. S. S. R. The power is furnished by two B. M. V. 6 power plants, developing 600 hp. each, and located on either side of the fuselage at the leading edge of the multi-sparred wing, which, including aileron compensators, has a spread of almost 94 ft. Eleven main tanks located in the central part of the craft, and a tank in each end of the wing, gave the craft a gas capacity of 872 gal.

Various dimensions of the plane are: Maximum wing chord, 18 ft.; overall length, 59 ft.; overall height, (in horizontal position), 20 ft.; stabilizer span, 24 ft., 9 in.; total wing area, (counting ailerons), 1,291.7 sq.ft.; total area of ailerons with compensators, 148 sq.ft.; area of stabilizer, 104½ sq.ft.; area of elevators, 92 sq.ft.; area of rudder, 44 sq.ft.; area of keel, 34 sq.ft.; maximum weight, 17,050 lb.; weight, empty, 9,900 lb.; maximum speed, 125 m.p.h.; cruising speed, 102.5 m.p.h.; landing speed, 56 m.p.h.; normal cruising range, 1,430 mi.; wing loading, 13.2 lb. per sq.ft.

Nineteen Stops Made

Following is a list of the various stops made by "Land of the Soviets" on its Moscow-New York flight:

Aug. 23—Left Moscow.
Aug. 24—Arrived at Kurgan, Siberia, from Moscow.
Aug. 26—Arrived at Novo-Sibirsk, Siberia.
Aug. 27—Arrived at Irkutsk, Siberia.
Sept. 1—Arrived at Chita, Siberia.
Sept. 2—Arrived at Blagoveschensk, Siberia.
Sept. 3—Arrived at Khabarovsk, Siberia; delayed nine days while wheels were replaced with pontoons.
Sept. 12—Arrived at Nikolayensk, Siberia.
Sept. 18—Arrived at Petropavlovsk, Kamchatka, Siberia.
Sept. 21—Arrived at Attu, most western of the Aleutian Islands.
Sept. 27—Arrived in Seward, first stop on the Alaskan mainland.
Sept. 29—Arrived in Sitka, capital of Alaska during Russian occupation.
Oct. 3—Arrived at Waterfall, Alaska, being forced down by engine trouble; delayed nine days while a new engine was installed.
Oct. 13—Arrived at Sand Point naval air base, Seattle.
Oct. 19—Arrived at Oakland, Calif.
Oct. 22—Arrived at Salt Lake City, Utah.
Oct. 23—Arrived at North Platte, Neb.
Oct. 24—Arrived at Chicago, Ill.
Oct. 28—Arrived at Detroit, Mich.
Nov. 1—Arrived at New York.

Curtiss-Wright Film Under Way

NEW YORK (N. Y.)—Designed for use in connection with ground and flying courses as well as for general public showing, Visugraphic will shortly offer a film in which the audience is taken on a flying visit to the various Curtiss-Wright Flying Service bases. Charles S. "Casey" Jones will play "an active and leading rôle."

Air Officials Address Flying Club Convention

COLUMBUS (OHIO)—Members of nearly a score of college flying clubs now in convention here, Nov. 8-10, as guests of the Ohio State Aeronautical Society, are to hear talks by many leaders in the aviation industry. They include Paul Henderson, vice president of T.A.T.; Charles S. Jones, president of the Curtiss-Wright Flying Service; Charles F. Kettering, president of the General Motors Research Corporation; William Stout, president Stout Metal Airplane Company; David S. Ingalls, Assistant Secretary of the Navy for Aeronautics; Grover Loening, of the Keystone-Loening company, and Clayton Bruckner, president of the Waco Aircraft Corporation.

Tentative acceptances have also been received from Col. Charles A. Lindbergh, Orville Wright, and Amelia Earhart. During the three-day meeting, those attending the conference will be taken on a tour of local airports and for aerial trips over the city in Curtiss and T.A.T. planes.

John M. Vorys, state commissioner of aviation, heads the Chamber of Commerce committee participating in the convention. Members of the Ohio State Aeronautical Society in charge of the meetings, are led by Thomas C. Pearse.

Ryan Offers Wasp Brougham

ST. LOUIS (MO.)—A Wasp-powered Brougham is now in production at the plant of Ryan Aircraft Corporation, following successful test flights of the first Ryan so powered by E. A. Yuravich. The machine will be initially exhibited at the Western Aircraft Show at Los Angeles Nov. 9-17. The price will be $16,900.

Safe Aircraft Contest Narrows to 12 Entries

MITCHEL FIELD (L. I., N. Y.)—A total of ten entries were registered here Nov. 1 for the Guggenheim Safe Aircraft Competition, with the arrival of three more craft. Two more planes, those of Rocheville Aircraft Corporation and J. S. McDonnell, Jr. & Associates, were reported en route, but definite information concerning the Cierva Autogiro, Pitcairn Cierva, and Dare Airplane Corporation entries was not available.

The following is the list of the ten arrivals, the first three being the late comers: V. J. Burnelli, Taylor Brothers Aircraft Corporation, Bourden Aircraft Corporation, Schroeder-Wentworth Company, Fleet Aircraft, Inc., Handley Page, Ltd., Command-Aire, Inc., Cunningham-Hall Aircraft Corporation, Ford-Leigh Safety Wing, Inc., and Curtiss Aeroplane & Motor Company, Inc.

Tests of the Handley Page, Curtiss, and Command-Aire planes, now under way, will continue, while the other craft will be tuned for the trials. The planes will require little time for preparation, with the exception of the Cunningham-Hall entry, for which a new Walter engine is awaited to replace the original plant which sustained a broken propeller shaft near Utica in the flight to Mitchel Field. In this incident, the propeller was lost and the plane was brought down in a forced landing, to be later dismantled and shipped the remaining distance.

Of the other twelve entries composing the original 27 on the lists Sept. 1 (the closing date) three were presented and withdrawn, eight were withdrawn before presentation, and one was tested and failed.

Menefee Field Meet, Nov. 2-3

NEW ORLEANS (LA.)—Army and Navy planes will be among some fifty craft expected to participate in the air carnival at Menefee Field, Nov. 2-3, marking completion of improvements to the extent of $150,000 on the port. The expansion program has included a new administration building a new hangar, and the extension of two runways to a full 2,500 ft. each, giving the field an A1-A rating. Ernest Lee Jahncke, Assistant Secretary of the Navy for Aeronautics, will be the guest of honor at a dinner given by the Young Men's Business Club for visiting pilots.

Pratt & Whitney Office in West

LOS ANGELES (CALIF.)—The Pratt & Whitney Aircraft Company of Hartford, Conn., has opened a West Coast office in this city, according to an announcement made by C. W. Deeds, secretary and treasurer of the company. The new office, located at 716 Petroleum Securities Bldg., is in charge of E. B. Haines.

Bar Studies Air Laws

MEMPHIS (TENN.) — Members attending the convention of the American Bar Association held here recently, heard discussions and suggestions concerning uniform air laws that might be established throughout the nation. As a result of so many conflicting state and county flying laws, the association deemed it wise to name a committee to study airway regulations and appointed Chester W. Cuthell of New York, chairman.

Nebraska Rail Group Air Meeting on Nov. 14

LINCOLN (NEB.)—Nebraska state railway commission has sent out invitations to all county attorneys and sheriffs, twenty chambers of commerce, twenty chiefs of police, airplane manufacturers, flying school operators and pilots, to attend a conference to be held at the state capitol building November 14, for the general discussion of a number of topics relating to the aviation industry in the state, and including provisions of the Nebraska aviation law, requirements under commission regulations, regulations necessary for pilots and aircraft licenses, aircraft traffic laws, and recommendations for revised laws and codes.

The last Nebraska legislature placed in the hands of the commission the enforcement of a new law patterned after the national act, intended to promote the public safety by requiring licenses for all pilots, who must first obtain such permit from the federal bureau, and by forbidding the use for passenger purposes of planes that did not have the Government stamp. No funds were provided for enforcement of the state law, so that the commission has no means, unless it draws on maintenance funds, of carrying out the law efficiently.

The commissioners wish to get the opinion of all pilots, owners of aircraft and manufacturers, law enforcement officers and others interested in the aviation industry, as to how the law may be best enforced in the state. Richard Lee, a federal bureau representative, will be present at the conference.

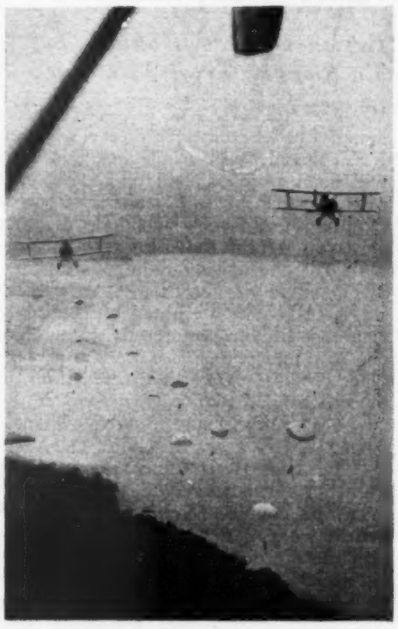
Air Trips for Car Buyers

BOSTON (MASS.)—Free airplane rides over Boston are offered to every purchaser of a used car by the Boston Whippet-Knight Corporation. Since this offer was introduced, some 150 persons have been given such rides, but many more than that have failed to take advantage of their opportunity. Charles H. Leonard, general manager of the company, is the pilot. He has a Waco plane of his own, and also acts as Boston sales agent for this type of craft.

Plane Bought by Town of 1,800

TARKIO (MO.)—This town of 1,800 people has bought a community airplane so that its merchants, farmers and clerks may learn to fly.

Twelve in a Row



STRUNG OUT in the air in the wake of the machine which carried them, twelve Navy and Marine Corps jumpers are shown above in a parachute feature event of the Navy Day program given Oct. 28 at the Anacostia Naval Air Station, Washington, D. C.

More Baltimore Show Entries

BALTIMORE (MD.)—Reports of activities in connection with this city's first Annual Aircraft Show, Nov. 9-14, indicate 26 planes have been listed for the exhibition, at this writing. They include two Berliner-Joyce biplanes, two Doye monoplanes, a Bellanca monoplane, a Bird biplane, a Cessna monoplane, three Challengers of various types, two Fairchild monoplanes, two Curtiss-Robins, a Curtiss Thrush, a DeHaviland Moth, a Lockheed Vega monoplane, three types of Travel Airs, a Waco biplane, a Consolidated craft, one Command-Aire, and one Fleet plane. According to Ray Krimm, director, it will be necessary to provide space for an additional 40 booths, as the 85 decided upon at first, will not take care of all the entries.

Wilkins Returning to Antarctic

DETROIT (MICH.)—The Detroit Aircraft Corporation says two Lockheed planes are at Deception Island, awaiting Sir Hubert Wilkins arrival, from which point he will take them on his Antarctic expedition, using them to fly over the polar regions. There was no special equipment installed on either of these planes except on the oil lines, which were covered with heavy asbestos and shellaced.

Will Test New Army Airplanes

Berliner-Joyce, Fokker To Supply Trial Machines

WASHINGTON (D. C.)—Word released by Assistant Secretary of War, F. Trubee Davison, indicates that tests will soon be conducted on a new type of two-place pursuit plane and on a twin-engined, three-place, long distance observation craft. Berliner-Joyce Aircraft Corporation is building the former, a plane no larger than the present single-seater, yet designed to carry two men and three machine guns rather than one man and two guns as in the present type. Fokker Aircraft Corporation, on the other hand, will furnish two of the new observation planes for experimental purposes.

"The tactical usefulness, as well as flight performance of these new types must, of course, be thoroughly tested before we can determine how they fit into the air defense program" said Mr. Davison. "It will be some time before the planes are ready and even more time will lapse before trials will have been completed. We are, however, extremely hopeful that the experiments will result in the development of new branches of pursuit and observation aviation and increase the efficiency and effectiveness of our Army air defenses.

"The bi-place pursuit plane is no larger than the present single-seater. The gunner is placed in a small compartment with his back to the pilot and is protected from the blast of the propeller by a windshield. Unlike the rear gunner in observation planes, he does not stand up in order to handle his weapon, but is seated with his eyes almost flush with the edge of the cockpit. Fixed to a low post on the fuselage is a machine gun which covers and protests the rear of the plane. It is not possible at this time to discuss the equipment or performance of the new ship nor the specific uses to which it may be put, for various reasons dictated by policy and also because it is an experimental type which we do not as yet know a great deal about.

To Climb on One Engine

"As for the new long distance reconnaissance plane, that, too, is a distinct novelty in Army Air Corps equipment in more than one respect. It is a monoplane equipped with two powerful motors and is designed to fly or climb on one engine. So far our only monoplanes have been in the cargo class. The new observation craft is also believed to have a wider cruising range and higher speed than observation planes now in use.

"These ships carry crews of three men in tandem—observer, pilot and gunner. The observer is located in the front cockpit and on account of the monoplane design he has exceptionally good visibility in all directions. The plane will be equipped with a powerful radio.

Instrument Firm Base in Wichita

NEW YORK (N. Y.)—Wichita, Kan., will be the location of the Mid-Western branch of the Consolidated Instrument Company, according to reports from the company's offices here. M. E. Hulse, Western sales manager of the company, and Prentiss Cleaves, Jr., will be in charge of the new office, which will carry a full line of Consolidated instruments for rapid distribution to nearby points.

Meeting of Inspectors At Kansas City, Nov. 1-3

KANSAS CITY (MO.)—Inspectors of the Aeronautics Division of the Department of Commerce held their annual three-day meeting here recently, instead of at Washington, D. C., where it has heretofore convened. Maj. Clarence M. Young, Assistant Secretary of Commerce for Aeronautics, had charge of the sessions while other Washington officials who attended were Gilbert G. Budwig, Assistant Director of Aeronautics; Joseph S. Marriott, Chief of the Department's aeronautic inspection service; E. M. Kintz, chief of the enforcement section; and H. F. Rough, Assistant Chief of the Inspection Service.

Other inspectors and officials attending were; W. O. Sergent and J. L. Kinney, both of Garden City, L. I.; George W. Vest, Chicago; E. E. Mouton, Oakland, Calif.; W. F. Parkin, Los Angeles; H. B. Templand, Dallas, Tex.; C. A. Charles and G. E. Gardner, Philadelphia; Leo Wilson, Atlanta, Ga.; L. W. Jurden, Kansas City; J. L. Moran, Boston; G. A. Wiggs, St. Louis; E. A. Cutrell, Washington, and R. E. Bedinger, Detroit.

The enforcement of the new rule which states that pilots can only carry passengers for hire in planes designated on the license, was one of the matters discussed at the conference.

Derby on Omaha Air Program

OMAHA (NEB.)—Three prizes totaling $1,500 will be given to winners of the Brandeis derby to be held here during the air show in connection with the state's Diamond jubilee celebration, Nov. 5-7. Among contestants expected to enter the race are Art Goebel, winner of the Dole San Francisco-Honolulu race, and Lieut. Harry A. Sutton, who was recently presented with the Clarence H. Mackay Trophy for meritorious Army flying (AVIATION Oct. 26). Officials announce that the Western Passenger Association, representing railroads, is considering a round-trip rate to this city during the jubilee at one and one-third the regular cost of passage.

Alabama Tour Starts Nov. 11

BIRMINGHAM (ALA.)—Alabama Air Tour, being sponsored by the Birmingham Chamber of Commerce, is to leave Birmingham Nov. 11.

NEW PLANES

NEW YORK (N. Y.)—Several manufacturers are building new types of airplanes, word reaching here from various companies, indicates. W. E. Laird, designer of the new Yunker three-place biplane, announces several changes will be made in the next planes turned out by Yunker Aircraft Company, Wichita, Kan. The first craft, designed by Feliz W. A. Knoll, has been test flown over a period of weeks. Changes, says Laird, will be mainly centered in the tail group, fuselage, and landing gear.

Details concerning two new designs in airplanes being prepared for the American Eagle Aircraft Corporation, Kansas City, are not available at this time. R. C. Gazley of the firm of Gazley and LaSha, aeronautical engineers in Washington, D. C., is assisting H. J. Stoneburner, chief engineer for the Eagle company in planning the craft, which will be of the open cockpit variety. One will be powered by a light radial engine while the other will employ a 200 hp. power plant.

Officials of the Jayhawk Aircraft Corporation, Wichita, Kan., expect to have the first new two-place, folding wing, open cockpit sport model, designed by Thomas M. Finnie, ready for test flights within 30 days. The craft has a span of 30 ft. 5 in., but with wings folded back, can be stored in a building 11 ft. by 22 ft. The plane will employ LeBlond power. Officers of the company are W. D. Egolf, Wichita, president; L. J. Christopher, Bucklin, Kan., and A. O. Rorabaugh, Wichita, vice-presidents; D. W. Eaton, Wichita, secretary-treasurer; and J. J. Kindscher, Beloit, Kan., and K. B. Lovett, Larned, Kan., directors.

A new type of airplane, designed by V. Eichholz, former postmaster at Zelienople, Pa., will shortly be manufactured at Franklin, Pa. A company is being organized and option on a factory site comprising 50,000 square feet has been secured, where it is planned to build a modern one-story factory building. Hangar privileges at the local airport have been acquired.

Air Associates in Export Deal

NEW YORK (N. Y.)—Completion of an agreement with United Aircraft Exports, Inc., is announced by Air Associates, Inc. According to the terms drafted, United will have exclusive right to the sale in all foreign countries, including Canada, of Air Associates' aircraft and automotive equipment and materials, and will distribute to all its foreign representatives the Air Associates' catalog and trade discount sheet, covering more than five hundred production and replacement items. As specified by United Aircraft Exports, shipments will be made to all foreign countries f.o.b. Garden City, L. I., N. Y.; and in accordance with the export firm's policy, discounts have been established, making possible protected resale by foreign agents.

Engineering Council To Oppose the Cable Bill

WASHINGTON (D. C.)—Regulation of interstate air transportation as proposed in the Cable Bill (H. R. 4286) will be opposed by the American Engineering Council. At a recent meeting of the administrative board, a resolution was adopted declaring that in view of the newness of the art and the rapid development of aviation as an industry, regulation imposed at this time would tend to throttle its growth.

No action was taken by the Council on Sen. Bingham's bill (S. 159) which would remove the present requirement for competitive bidding in obtaining additional parts for Army and Navy aircraft. The council took the position that this is an administrative matter, although members of the board individually expressed themselves as favoring Senator Bingham's proposal.

Pending bills (S. 19 and H. R. 1420) that would authorize the Secretary of War to loan aeronautical equipment and material for research and experimentation purposes, were endorsed by the Council.

Six Planes Now Offered In Curtiss Company Line

NEW YORK (N. Y.)—Six planes are now included among the commercial products of Curtiss Aeroplane & Motor Company, each of a different type and designed for a different purpose. The craft range in size from the little two-passenger Robin to the eighteen-passenger Condor transport now used by T.A.T.

Others in the group include the Fledgling training plane, standard in the U. S. Navy and at all Curtiss-Wright Flying Service schools; the Thrush, a five-passenger edition of the Robin; the twin-engined Kingbird, still in the engineering division; and the new Carrier Pigeon mail plane now in service with N.A.T.

The Thrush is now in full production at the plant of Curtiss-Robertson, Anglum, Mo. The first few made will be shipped to China to open the new mail and passenger routes under the joint auspices of the Curtiss-Wright interests and the Chinese Government.

Production of the other four planes will continue at the Curtiss Aeroplane & Motor Company Buffalo plant with the exception of the Fledgling, which will now be built at the Keystone factory, which is located at Bristol, Pa.

Flat Rocks Alive; Flier Quickly Goes

CHICAGO (ILL.)—Executives of the Southern Sugar Company here recently visited the Canadian lake country, west of Hudson Bay, in their flying office, a Sikorsky S-38. The pilot, Lieutenant Pomeroy, noticed a large number of "queer, flat rocks" while crossing over the Bay and landed to have a closer look. As he did so, they disappeared under water. When the "queer, flat rocks" came to the surface again as whales and began nosing around the plane, Pomeroy "burned up the bay," the report reads, in his hurry to be up and off.

NB-3 to Popular Mechanics

MARSHALL (MO.)—Nicholas-Beazley Airplane Company announces the sale of a Barling NB-3 plane to *Popular Mechanics Magazine* for use in conducting experiments of lighting effects on airplanes at the Ohio Insulator Company, Barberton, Ohio. Paul D. Paddock, accepted delivery of the plane.

Test New Eight-Place Consolidated Fleetster

BUFFALO (N. Y.)—Tests of the new "Fleetster," an eight-place plane recently developed by Consolidated Aircraft Corporation, have been made by Lieut. Leigh Wade, chief test pilot, and Department of Commerce officials are to inspect the craft in the near future. The plane, designed by Lawrence D. Bell, general manager of the firm, is of monocoque construction and is said to be especially suited for high speed transportation and commercial service.

The "Fleetster" has a span of 45 ft., is 31 ft. long, 3 ft. 9 in. wide, and 9 ft. in height. N. A. C. A. Cowling and Pratt & Whitney power are used. Six passengers are seated in two rows of three chairs, while the seventh sits forward near the pilot. The upholstery has been placed over a two-inch thick insulation padding designed to insure quiet for the passengers. Baggage and express matter is carried in the rear.

Select Chicago For 1930 Races

City's Business Leaders Have Subscribed $137,500

CHICAGO (ILL.)—This city will be the scene of the 1930 National Air Races, it has been announced, following subscriptions amounting to $137,500 of the $200,000 necessary for promotion of the venture, coming from 31 business, aviation, and financial leaders.

The National Aeronautical Association in Washington picked Chicago as the site for the annual air classic two weeks ago, but no formal announcement was made until some of the advance money had been raised. If there is a repetition of last year's success in the 1930 show, the subscription money will not have to be touched. Cleveland men raised $300,000, but advance sales of tickets and concessions brought in enough to pay for preliminary expenses.

Col. Robert R. McCormick, publisher, chairman of the Chicago Air Race Corporation—a non-profit company formed to underwrite the races, headed the local committee which went to Washington and presented this city's bid for the event. Others of the group included V. L. Alward, vice-president of the Chicago Association of Commerce; Maj. Reed Landis, representing Chicago aviation interests; Alderman Dorsey Crowe, chairman of the council committee on aviation, and Edward J. Brundage.

It is not yet known just when the 1930 Races will be staged, but it is thought the show will start the week before Labor Day and last eight days so as to take in that holiday.

At a recent meeting of the enthusiasts backing the proposition, the following officers were elected: Col. McCormick, chairman of the board; Earle H. Reynolds, president; Frederick H. Rawson, treasurer, and Capt. M. M. Corpenning, secretary. Rear-Adm. Walter S. Crosley, and Maj. Gen. Frank S. Parker, commander of the Sixth Corps Area, were elected honorary vice presidents of the Chicago Air Race Corporation.

Fairchild Maps Albion Holdings

ALBION (CALIF.)—Fairchild Aerial Surveys of San Francisco, recently finished an air-mapping job for the Albion Lumber Company. Photographs of the firm's timber holdings were made from an average height of 12,000 ft.

The Curtiss firm's full family of birds—from left to right, Condor, King Bird, Thrush, Robin, Carrier Pigeon II, and Fledgling

Hill States Powerful Air Trust is at Work

WASHINGTON (D. C.)—That Senator Bingham "was manipulated" into his position as National Aeronautic Association head by interests which would profit from Government aircraft contracts and that he is now the "mouthpiece" of an air trust in Washington, is charged in a letter delivered to the Senate lobby investigating committee Oct. 31. The letter was sent by Thomas L. Hill, president of the American Society for the Promotion of Aviation, which maintains headquarters in New York City.

The opening paragraph of the letter states that more than $100,000,000 worth of airplane contracts for "inferior machines" have been diverted to members of the air trust "to the exclusion of more efficient, safer and cheaper planes made by independent aircraft manufacturers." Eleven confidential memoranda accompanied the letter as exhibits and are said to prove the truth of the statements. In resumé, the fifteen charges made by Hill are as follows:

Charges Made

(1) That the trust operates through the N.A.A., Aircraft Manufacturers' Association, and the Aeronautical Chamber of Commerce; (2) that the trust has worked for the passage of legislation diverting money to its members; (3) that aircraft purchased have taken scores of lives, whereas cheaper and more efficient craft might have been secured; (4) that Senator Bingham's N.A.A. position was "manipulated"; (5) that a person publicly denounced for his part in diverting aircraft contracts in 1917-18 is again doing so; (6) that advertising contracts for Government planes were not advertised according to the House Bill passed by the 69th Congress; (7) that trust members worked through advertising contracts to control the policy of various air magazines; (8) that the Aeronautical Chamber of Commerce strived to prevent its members from exhibiting in the New York air show given by the American Legion last February; (9) that agents of the trust have been placed in influential Government positions; (10) that confidential information relative to aircraft inventions have been taken by trust members; (11) that tests of engines made by firms outside the trust have been purposely delayed in the Aeronautics Branch, Department of Commerce; (12) that paid admissions were charged in opposition to the law when Government air fields, equipment, and soldiers were used; (13) that machinery of the Government has been used for propaganda purposes; and (14) that the press has been duped as well as Army, Navy, and Department of Commerce officers. Charge No. 15 draws attention to confidential Exhibit K, a list of men who may be supoenaed to prove the truth or falsity of the statements.

Seek Better Coast Guard Plane

WASHINGTON (D. C.)—Coast Guard officials have entered into negotiations with several aircraft manufacturers in an effort to find a seaplane more suitable for Coast Guard operations than the type now in use. One which could go on coast missions for 12 hrs. without refueling, and stand rougher treatment, is being sought by that department. The five planes owned by the Coast Guard have covered as high as 8,000 sq.mi. in an hour and last year, the craft flew a total of 989 hr., covering 84,083 mi. on its rescue and rum-hunting flights.

Few Subject to Air Sickness Data Shows

NEW YORK (N. Y.)—Called "a minor but difficult problem," air sickness is treated in a bulletin issued by the Guggenheim Fund Nov. 1. Progress thus far achieved in the determination of causes and remedies are reviewed in surveys of representative opinions in Italy, Germany, Great Britain, and the United States.

"It is apparent," according to the conclusion of the bulletin, "that air sickness is not only much less prevalent than sea sickness, but is much more easily prevented or ameliorated by comparatively simple methods. Such statistics as are available indicate that only about 5 per cent of the passengers in air transportation are subject to air sickness. In general the difficulty is derived from two causes—one psychological, the other physical. Disorders of this kind are frequently the result of nervousness on the part of the individual who is not accustomed to aviation. The obvious solution here is, of course, the growing public confidence in aeronautical safety, and as airplane travel becomes more and more a matter of course, most of this psychological disorder will be eliminated. From the physical standpoint the particular cause of air sickness seems to be lack of proper ventilation. Air sickness occurs nearly always in closed cabin planes, and the successful passenger transport companies will be those which so design their cabins as to guarantee proper ventilation.

Szekely Engines for Ace Planes

WICHITA (KAN.) — O. G. Corben, president of the Ace Aircraft Corporation, announces the placing of an order for airplane engines with the Szekely Aircraft & Engine company of Holland, Mich. The company will use the Szekely engine in the sport solo plane being built at the Wichita factory. The first Baby Ace has been put through exacting tests and four other single-place planes are being rushed through the factory. The company's present production schedule, according to Corben, is four planes weekly. The Supreme Propeller Company, of Wichita, has a contract with the Ace firm to furnish specially designed propellers for the Baby Ace.

Officials Say Exports Relieve Over-Production

WASHINGTON (D. C.)—Government foreign trade experts announced last week that the increased activity in foreign buying of aircraft has assumed such proportions as to be of material benefit in lessening the danger of overproduction. The South American and Chinese markets are particularly promising, it is stated. For the most part, foreign buyers seem to prefer the cabin type style of plane.

Efforts are being made by the Aeronautical Chamber of Commerce to bring aircraft manufacturers and foreign trade experts of the Commerce Department together in a conference for devising means of developing foreign buying so that it comes during dull periods in the domestic market. It is believed that any serious danger arising from overproduction can be eliminated by a more intelligent planning of sales abroad.

In regard to remarks that have been made about over-production, Government officials have made the suggestion that manufacturers voicing this complaint could improve their situation materially by taking advantage of the new developments within the industry. It is usually those who are not keeping pace with the steady improvements that are being made who are the most troubled with over-production, it is asserted.

Government experts analyzing the market, have arrived at the conclusion that while there is some slowing up in the demand for single-engined cabin planes, the demand for multi-engined craft still remains very active. As to the foreign market, it is reported that recent increases have been noted in orders from countries in both the eastern and western hemispheres for military aircraft.

Start Sikorsky Addition

BRIDGEPORT (CONN.)—Steel construction on the new engineering building of Sikorsky Aviation Corporation here, will commence shortly. Foundations have already been laid for the structure, which will cost approximately $150,000 and be used as a laboratory for various experiments and new designs. The present factory space of 145,000 sq.ft. will be added to by 45,000 sq.ft. upon completion of this building. The entire plant site occupies 36 acres adjoining the Bridgeport Airport.

New Buckley Factory Started

WICHITA (KAN.)—The Buckley Aircraft Company has started work on a new factory building east of Wichita, in which the manufacture of the all-metal Buckley monoplane will be undertaken. Soon after the first of the year, a larger factory building will be constructed, according to Roy Buckley, president of the company. The Buckley company recently entered into an agreement to furnish planes to the Yellow Air-Cab Company, with headquarters in Wichita.

Announce California Tour Route for Nov. 4-7

LOS ANGELES (CALIF.)—Following itinerary has been approved for the California Air Tour to be run Nov. 4-7, in connection with the All-Western Aircraft Show which will be in session here at the time: Leave Los Angeles Metropolitan Airport, Van Nuys, Nov. 4, 9:00 a.m., arrive Santa Maria, 11:00 a.m.; leave Santa Maria 1:00 p.m., arrive Salinas 2:45 p.m.; leave Salinas 3:45 p.m., arrive Oakland Municipal Airport 5:00 p.m.; leave Oakland Municipal Airport Nov. 5, 9:00 a.m., arrive Mills Field, San Francisco, 9:30 a.m.; leave Mills Field 10:30 a.m., arrive Sacramento 12:00 (noon); leave Sacramento 2:30 p.m., arrive Stockton 3:15 p.m.; leave Stockton 4:00 p.m., arrive Fresno 5:15 p.m.; leave Fresno Nov. 6, 9:00 a.m., arrive Visalia 9:30 a.m.; leave Visalia 10:30 a.m., arrive Bakersfield 11:15 a.m.; leave Bakersfield 1:30 p.m., arrive San Bernardino 3:00 p.m.; leave San Bernardino 3:45 p.m., arrive El Centro 5:15 p.m.; leave El Centro Nov. 7, 9:00 a.m.; arrive Long Beach 11:00 a.m.; leave Long Beach 11:30 a.m., circle city of Los Angeles and land at Mines Field, Los Angeles Municipal Airport, 12:00 noon.

All planes on the tour will be grounded at each stop, no promiscuous flying being permitted, and no carrying for hire will be allowed plane operators entered in the tour. At each stop the many planes will represent a traveling aeronautical exposition, serving to bring many types of planes to the notice of thousands of persons who could not be brought to an exposition building. Literature of the various companies will be distributed and sales contacts made at every opportunity during the air tour.

Sponsored by the Los Angeles Junior Chamber of Commerce, under the direction of M. E. McCreery, Air Week Committee Chairman, Theodore "Ted" Schleuter will be in charge of all ground arrangements; C. F. Lienesch, flight chief; Dudley Steele, chief of service operations; D. E. McDaneld, chairman of entrants committee; and W. E. Thomas, tour chairman.

Wyoming Press Drafts Code

CHEYENNE (WYO.) — Following in the steps of the California Newspaper Publishers' Association, the Wyoming Press Association has also adopted a resolution asking that news published of air accidents contain all the data possible concerning licensing of plane and pilot, the type of plane, and whether the pilot was licensed to carry passengers. In addition the Association declared it will do all in its power in inducing the public to refuse flights in planes or with pilots not properly certified by the Department of Commerce. Roscoe Alcorn, president, headed the executive committee which presented the resolution.

National Playground Model Plane Meet Held

LOUISVILLE (KAN.)—Fifty-one boys representing sixteen cities, took part in the fourteen competition divisions which featured the Third National Playground Miniature Aircraft Tournament, ending here on Oct. 19. Henery Pacevitz, Chicago, Ill., proved the champion flier of the occasion when his fuselage model entered in the Junior outdoor class, flew for 14 min. 35.4 sec., and then was lost to view of the judges, traveling approximately two miles.

A check-up of the models entered indicated the boys had spent many hours on improving the designs and workmanship of their miniature airplanes. Comment was also made of the good sportsmanship the youths displayed during the competition.

Heading the list of the various champions in number of points received, whose planes took off from the water as well as the land, were Ernest Marcouiller, Chicago, Ill., Senior champion; and Edwin O'Donovan, Topeka, Kan., Junior champion. The various cities with entries were: Chicago, Ill.; Washington, D. C.; Knoxville, Tenn.; Topeka, Kan.; Baltimore, Md.; St. Louis, Mo.; Evanston, Ill.; Elmira, N. Y.; Providence, R. I.; Boston, Mass.; Buffalo, N. Y.; Houston, Tex.; Louisville, Ky.; New Haven, Conn.; San Diego, Calif.; Wilkes-Barre, Pa.

Gliders of the Future Will Be Designed to Carry Outboard Engine Power Declares Aero Branch

WASHINGTON (D. C.)—Aeronautics Branch expects the glider to be developed to the point where an outboard engine may be attached to it much in the same way as practised in the motor boat field. This was announced in a statement made on Oct. 23 in connection with a discussion of gliders on a commercial scale.

The Aeronautics Branch mentions that gliders are being studied to determine improvements for airplanes. One experiment now under way is with the view of perfecting the wing of an engined-craft. Glider building specifications have been devised by the Department of Commerce and cover design load for wings, for control loads, for landing gears, for fuselages, control systems, covering, towing, equipment, instruments, and inspection flight tests.

The Department is not in favor of gliders without air controls, as it does not consider the machines safe without them. Licenses for manufacturing gliders are not granted until certain tests have been complied with, and identification numbers are issued to engineless craft just the same as to ordinary airplanes using power plants.

Commerce Department Crash Findings to Senate

WASHINGTON (D. C.)—With request for information on the cause of the crash of the T.A.T.'s "City of San Francisco," the Commerce Department transmitted a statement to the Senate Commerce Committee on October 31, attributing the responsibility for the accident to the pilot. The statement, which was signed by Secretary Lamont, points out that the Commerce Department does not attempt to determine legal responsibility in investigating and reporting the causes of air accidents.

In absolving the plane or the transport company of all blame for the accident the report states that at no time preceding the accident does the evidence disclose that the airplane failed to function properly. While it is brought out that the lack of eyewitnesses makes it difficult to determine definitely the contributing factors, it is stated that three alternatives suggest themselves in this respect: They are as follows:

That the pilot may have entered the storm area intending to fly through it and emerge into good flying conditions on the other side, and had miscalculated the direction and velocity of the accompanying winds. That the pilot in westerly flight may have been unable to avoid the area and was attempting to remain under it, flying close to the terrain, and unexpectedly collided with a rise in the slope at the place of the accident. That he may have been attempting to pass between the storm and the mountain and did not properly calculate the relative velocities of the storm and the airplane.

The Commerce Department was also asked by the Senate to furnish a statement showing the causes of a crash that occurred at a field near Memphis involving a licensed plane that was taken up by an unlicensed pilot accompanied by two passengers. The report on this accident states that the pilot was flying the plane in violation of the owner's instructions and that he was executing acrobatic maneuvers at low altitude. Valley Air Line licensed the craft.

During one of the acrobatic maneuvers that the plane was put through, flying speed was lost and the pilot was unable to regain control before contact with the ground. This is given as the apparent cause of the accident, as nearly as it could be ascertained from the information available. Mention is made in the report that the flight was made in violation of the air commerce act. This is in answer to the charge which it was construed the Senate implied in the part of the wording of its resolution which stated that an unlicensed pilot had been permitted to take up a licensed plane.

Portland Firm to Air-Map Seattle

SEATTLE (WASH.) — Contract for air-mapping Seattle and environs has been awarded Aerial Mapping Engineers, Inc., of Portland.

BRIEFLY

Reports that the U. S. contract for a proposed air mail route from Paramaribo, Dutch Guiana, to Buenos Aires via the east coast of South America has already been awarded, are erroneous, according to an announcement by W. Irving Glover, Assistant Postmaster General.

There are 156 students enrolled in the three flying schools in Oklahoma City. The Universal school leads with 73.

Arthur Starbuck, Pacific Air Transport pilot, has completed 7,500 hr. of flying.

Grants Pass Flying Service has been organized at Grants Pass, Ore., by H. W. Wihlon, with Jack McArthur as chief pilot.

The effectiveness of automatic sprinkler systems in controlling fires of aircraft in modern hangars will be tested at Newark Airport, Nov. 20.

Silver Fox Airlines, Muncie, Ind., is planning an airline between Indianapolis, Muncie and Anderson.

Pilots of Universal Aviation Corporation will receive service ribbons awarded at 6, 12, 24 and 36-month intervals.

Missouri has 227 licensed pilots, 193 licensed planes and eighteen airports, according to figures recently compiled.

Complete remodelling of the Mercury racer which was to have been entered by Lieut. Alford Williams in the Schneider Cup races, has been authorized by the Navy Department.

Motion pictures of the T.A.T. transcontinental route will be made and distributed by Visugraphic.

Rush of business for the football game between Stanford and University of Southern California resulted in the storage of 102 planes in the hangars of Oakland Municipal Airport for the night of Oct. 26.

An Eastern sales agency for Cessna Aircraft Company is being organized by Maj. Howard Wehrle, general manager, to take over distribution when the contract with Curtiss-Wright Flying Service expires Jan. 1.

State employment of an airport engineer to aid smaller communities in building airports is recommended by Harry G. Slater, of the Wisconsin legislative interim committee on aeronautics.

Greater Miami (Fla.) Airport Association is sponsoring model plane contests among school children.

For those not familiar with naval designations, the letters ZRS-4 applied to the new airship, construction of which will be begun soon, mean lighter-than-air rigid scout No. 4.

Thrice weekly passenger service between Leroy W. Thompson Airport, Bethany, Conn., and Holmes Airport, New York, N. Y., is maintained by Hill & Somers.

Curtiss-Wright Flying Service has completed an aerial survey of extensive areas in Missouri, Arkansas, Kentucky, Tennessee and Mississippi undertaken as part of the government flood control program. In three months, 11,419 negatives were taken.

Vincent Bendix, president of Bendix Aviation Corporation, reports that he has signed several important contracts during his tour of Europe.

The city of Baltimore has created the positions of inspector to operate and maintain the floodlights at Logan Field, at $1,800 a year; and topographical engineer for the new municipal airport now under construction, at $1,700 yearly.

Two Army Air Corps pilots from the Panama Canal Department have been assigned to temporary duty as instructors in San Salvador.

Engineers of Comet Engine Corporation have designed an air straightening grid to eliminate whirling of the slipstream from engines on the torque stand.

Breckinridge, Tex., was made a regular stop on Southern Air Transport's Dallas-El Paso route beginning Oct. 7.

Business men in Portland and Spokane, Wash., have sent a protest against the delay in lighting the Portland-Pasco route to the Department of Commerce. The delay has been due to difficulties in lighting the route through the Columbia Gorge.

A Stearman biplane has been delivered to the Detroit Steel Products Company, Wichita, Kan.

Ross Field, Arcadia, Calif., formerly leased by the Government for balloon school purposes, has been taken over by Roy Knabenshue, veteran dirigible pilot.

New Firms Announced

REPUBLIC AIRCRAFT CORPORATION, Chicago, Ill.; capital $1,000,000; by Ruben Levine, R. H. Julien, H. F. Fawcett, R. A. Carter, Lewis Harris; to build an airport in Kankakee County, Ill., conduct flying schools and manufacture aircraft.

BERKELEY AVIATON SERVICE, LTD., Berkeley, Calif.; capital $50,000; by Capt. William Royle, M. A. Haufe, C. A. Haufe, F. J. Pierce, J. F. Elb; to conduct a flying school and taxi business.

SAN LUIS VALLEY AIRWAYS, INC., Alamosa, Colo.; capital 50,000 shares of no par-value; by J. D. O'Haver, H. T. Miller, C. D. Smith.

RELIABLE FLYING SERVICE, INC., Watertown, Conn.; capital $50,000; by Thomas F. Butterfield, Merritt W. Atwood, Buell H. Hemingway, William H. Jones, Edward Butterworth.

BALTIMORE AIRPORT, INC., Baltimore, Md.; by Oliver B. Rutherford Frederick Neeseman, J. Leroy Hopkins; to build airports, operate flying service and deal in aircraft.

MIAMI AIRPLANT & SUPPLY CORPORATION, Miami, Fla.; capital 500 shares preferred stock, par value $100; by A. L. Hefinger, C. N. Robertson, G. L. Wells.

Jenkins Shields Radio Set Instead of Ignition

WASHINGTON (D. C.)—Shielding of a radio set as a substitute for shielding the ignition and electrical equipment of airplane engines has been successfully tried by C. Francis Jenkins. Mr. Jenkins has purchased a four-place Stinson Junior cabin plane with Wright J-5 engine, without shielding, bonding of metal parts or other changes, which he is using in his experiments. He does arrange to have the antenna extended in the "electrical shadow" of the plane, which he discovered some months ago.

Voice signals were received successfully in the plane during take-off and without diminution of strength up to a distance of 35 mi., which was the extent of the first experiment. Subsequently, successful communication with the ground station was maintained during a flight to Philadelphia by means of a specially built transmitter and receiver weighing but 26 lb., including batteries. The whole was placed in a metal box 17x13x4 in. Mr. Jenkins is planning experiments in television transmission from the plane, and he points out the great military value which they will have if successful.

Schools & Colleges

ADCOX SCHOOL students, Portland, Ore., have built a three-place biplane in the school shop, under the direction of R. E. Gilliam.

MCCOOK DAILY GAZETTE, McCook, Neb., has started a flying school.

MARSHALL FLYING SCHOOL, INC., Marshall, Mo., supplements the ground school course with moving pictures.

RANKIN SCHOOL OF AVIATION, Vancouver, B. C., has been started by Dudley Rankin.

AIRTECH SCHOOL OF AVIATION, San Diego, Calif., has inaugurated glider classes under the direction of W. H. Bowlus.

UNIVERSITY OF SOUTHERN CALIFORNIA has 175 students enrolled in six aviation courses.

SPARTAN SCHOOL OF FLYING, Tulsa, Okla., is to open a special class for women under the direction of Miss Mae Haizlip.

WICHITA SCHOOL OF FLYING has moved into new quarters at the Wichita Municipal Airport. It will move into its own $40,000 hangar when that is completed.

Ontario Pilots Fly 11,500 Hr.

TORONTO (ONT.)—All operating records of the Ontario Provincial Air Service were shattered this year, according to Capt. Roy Maxwell. The pilots had a total of 11,500 hr. in the air since May 1, this being 5,400 hr. more than in 1928. None of the staff or passengers, which the service was called on to carry from time to time, was injured.

PERSONNEL

LIEUT. A. W. GORTON has resigned from the Naval Air Service to become aeronautical adviser for Curtis Publishing Company. He is at present acting as pilot for the company's Ford plane which has been touring the country.

THOMAS KEENE, Taft, Calif., has been elected president of the West Side Flying Club.

WINFIELD S. SHANNON has resigned his position as sales manager of Curtiss-Wright Flying Service, Detroit, to direct aviation activities for Quaker State Oil Refining Company, Oil City, Pa.

H. C. LARSON, field manager for Varney Air lines at Pasco, Wash., has been appointed government airport weather observer there.

WALTER C. HECKER has been elected president of Curtiss Manufacturing Company, St. Louis, Mo., of which Curtiss Pneumatic Machinery Company is a division.

JAMES C. SHULTZ and ERWIN F. SKOCDOPOLE, transport pilots, have been added to the staff of Flo Flying Services, Inc., Ann Arbor, Mich.

MRS. CLAIRE FAHY has been named official hostess for Los Angeles Municipal Airport.

E. O. BENNETT, chief engineer of Continental Oil Company, has been appointed manager of Everett Tailor Airport, Ponca City, Okla.

GEORGE GRUEN has been promoted to chief instruction pilot for Parks Air College, E. St. Louis, Mo., succeeding CLYDE E. BRAYTON, who becomes assistant to the vice-president.

LIEUT. ZEUS SOUCEK has resigned from the Navy Air Force, effective Dec. 26, to accept a position with Eclipse Aviation Corporation, East Orange, N. J.

EARL R. SOUTHEE has been made manager of Curtiss-Wright Flying Service at Columbia, S. C.

JAMES H. CLARK has been elected president of the Air Corps Association, Portland, Ore. ARCHIE ROTH is vice-president and H. W. BRADFORD, secretary.

HOWARD G. ESTES has been named as sales representative for Spartan Aircraft Company in Illinois, Indiana, Ohio and Kentucky.

PRENTISS CLEAVES, JR., has been made western service manager for Consolidated Instrument Company, with headquarters in Wichita, Kan.

BETTY HUYLER, who recently won a spot landing contest in competition with men pilots, is now sales representative for Curtiss-Wright Flying Service in New York City.

ROBERT C. SHAEFER has been made assistant director of the downtown branch of St. Louis-Universal Flying School, St. Louis, Mo.

CAPT. L. A. MILLER, recently director of Porterfield-Universal Flying School, Fairfax Airport, Kansas City, Mo., has taken a position with Universal Aviation Corporation at St. Louis. TRUMAN GILE succeeds him as director of the flying school.

WILLIAM BREWSTER has been appointed chief pilot of the Von Hoffman Aircraft School, St. Louis.

O. H. HAMM, recently with the engineering branch of the Air Corps at Wright and McCook Fields, Dayton, Ohio, has resigned to take a position with The Aviation Corporation, New York City.

Representatives Named

ARROW—John B. Regan, Shawnee, Okla.; Mason Colbert, Nebraska City, Neb.

CURTISS-WRIGHT FLYING SERVICE—Allton Flying Service, Columbia, Mo.

MONO AIRCRAFT—Minnesota Monocoupe Agency, St. Paul, Minn.

NICHOLAS-BEAZLEY — Southern Aircraft Company, Inc., Tulsa, Okla.; Aeronautical Corporation of Canada, Ltd., Winnipeg; for Canada.

WACO—Yarbrough Motor Company, Atlanta, Ga.

AERONAUTICAL CALENDAR

Nov. 8-10	Intercollegiate Aeronautic Conference, Columbus, Ohio
Nov. 9-17	Western Aircraft Show, Los Angeles
Nov. 11	Start of all-Alabama Air Tour at Birmingham Airport.
Nov. 12-13	S.A.E. Aeronautic Meeting, Los Angeles, Calif.
Nov. 18	Lehigh Airport Design Competition Closes. Lehigh Portland Cement Company.
Nov. 25	Hearing on proposed Southwestern Transcontinental Air Mail Route, Washington, D. C.
Dec. 9-14	Baltimore-Washington Aircraft Show, Baltimore, Md.
Dec. 10-16	National Aviation Week, Mexico, including air show and air display at Mexico City.
Dec. 16	Regional Airport Conference for New England, Bridgeport, Conn.
Jan. 13, 1930	S.A.E. Aeronautic Meeting, Miami, Fla.
Jan. 21	S.A.E. Annual Meeting, Detroit, Mich.
Feb. 5-12	New York Aviation Show, auspices Aviators' Post, American Legion.
Feb. 15-23	International Aircraft Exposition, St. Louis, Mo.
Mar. 6-15	Second Annual Pittsburgh Aircraft Show. Motor Square Garden, Brown Boulevard, Pittsburgh, Pa. Office is Aero Club, Pittsburgh, William Penn Hotel.
April 5-13	All-American Aircraft Show, Detroit.
May 3-10	New York Aircraft Salon, auspices Metropolitan New York Division, Distributor-Dealers Section, Aeronautical Chamber of Commerce, at Madison Square Garden, New York City.

AIR MEETS

Nov. 9-10	At Candler Field, Atlanta, Ga.
Nov. 11	Air Meet, Ranger, Tex. Airport.
Jan. 13-15	All-American Air Meet, Miama, Fla.

AIRPORT DEDICATIONS

Nov. 8-9	Bates Fields, Mobile, Ala.
Nov. 11	Alamosa, Colo., Airport.
Nov. 11	Duluth Municipal Airport, Duluth, Minn.
Nov. 11-12	Tallahassee, Fla., Airport.
Nov. 15	Curtiss-Steinberg Airport, St. Louis, Mo.
Nov. 15	Kinsolving Airport, Abilene, Tex.
Nov. 26	Ware County Airport, Waycross Ga.
Dec. 4-5	Roswell, N. M., Airport.

Bell Laboratories Use Ford for Experiments

NEW YORK (N. Y.)—Bell Telephone Laboratories, Inc., have recently accepted delivery of a Ford plane with three Wasp engines which will be used as a flying laboratory. Special equipment for experiments with radio has been installed, and the immediate program calls for the testing and refinement of transmitting and receiving apparatus already developed by the Bell Laboratories. The new plane is operating at present from Hadley Field, as is the Fairchild plane which the company has been using for some time.

When the Ford came from the factory, it was equipped with two large laboratory benches and a variety of antennas, including two of the trailing wire variety and two streamlined vertical rod antennas. The engines are so arranged as to supply power through generators when required, and storage batteries and wind-driven generators are also provided. Special shielding and grounding of metal parts of the plane has also been arranged. The Western Electric two-way radio-telephone system is now being installed.

Test Huge Neon Beacon

ST. LOUIS (MO.)—A Neon beacon made by the General Neon Corporation, St. Louis, was tested at Lambert-St. Louis Field recently and was seen by the pilot of a plane about 50 mi. away. The beacon consists of a 15-ft. tower with an interlacing of Neon tubes on its four sides. The light is red. The manufacturers claim it can be seen through fog for some distance. Similar beacons are to be demonstrated at Kansas City, Mo., and at the T. A. T. airport at Clovis, N. M.

St. Hubert Airport Busy

OTTAWA (ONT.)—Between Oct. 1, 1928 and July 1, 1929, 4,158 bags of mail were received at St. Hubert Airport, Quebec, according to a report issued by the Post Office Department. During the same period, 322 operating planes reported at the airport, while 293 reported out, with 308 passengers arriving and 305 departing. Aircraft imported through the port comprised 35 planes, valued at $432,928. In addition, 392 pieces of baggage were examined by airport customs officers.

Oakland Reports 2-Yr. Traffic

OAKLAND (CALIF.)—During the first two years of operation of Oakland Municipal Airport, recently completed, 134,748 airplane landings were recorded, 81,408 passengers carried and 17,156 student flights made. This is equivalent to 185 landings daily, or one landing and take-off every four minutes on the basis of a 12-hr. flying day. This traffic has been handled without a single serious accident.

AIRPORTS AND AIRLINES

Aerial Express Announces Plans

LOS ANGELES (CALIF.)—Incorporation of the Aerial Express Corporation, Ltd., said to be the first air transport line in this country to devote its entire facilities to the hauling of freight and express, has been announced by Alfred Malling, president. According to present plans a fleet of seven Fairchild 71 Wasp powered cabin monoplanes will be used to inaugurate the service, these planes being altered for freight carrying by removing all interior fittings from the cabin, placing a bulkhead across in rear of the pilot, and lining the compartment with duralumin sheeting.

For the present the freight lines established will be confined to the Pacific Coast area and will serve all coast cities between San Diego and Seattle, with a spur line at the southern terminus extending from San Diego to Imperial Valley points to provide air facilities for the rapid handling of certain produce crops. Offices and freight depots will be established in all principal cities, the freight depots being centrally located and trucks delivering freight from the depot to the air field and also delivering incoming freight free of charge to any point within a five mile radius of the depot. Rates are not yet definitely established but are expected to be in line with existing air express rates, the company relying for traffic upon a highly specialized and efficient service.

Two of the planes are to be equipped with refrigerator systems for handling of perishable fruit. Other sources of traffic are said to include fish from both Alaska and the Mexican Gulf, flowers, legal papers and valuable documents, newspapers and magazines, and an important service will be rendered to undertakers by a special plane.

Officers of the aerial express company include: Alfred Malling, formerly director of retail sales for the Fairchild Airplane Manufacturing Corporation, president and general manager; H. R. McClintock, president of the Russell Parachute Company, San Diego, first vice-president; Otis Hoyt, Long Beach oil operator, second vice-president; A. L. Armstrong, Los Angeles attorney, secretary, and Edwin Magruder, director.

Move to New Denver Port

DENVER (COLO.)—Western Air Express, operating the Cheyenne-Denver-Pueblo air mail route; Midcontinent Express, operating the Denver-Albuquerque passenger line; and United States Airways, operating a passenger line between Denver and Kansas City, have moved from Lowry Field to the new Municipal Airport.

Announce Miami-Havana Route

MIAMI (FLA.)—Twice daily passenger transport service between this city and Havana, Cuba, will be inaugurated Dec. 10 by New York, Rio & Buenos Aires Line. Commodore flying boats will be used, and the fare will be $55 one way or $100 round trip. Exact schedule has not yet been announced, but the flight will be made in two hours and 10 min. according to present plans.

Navy Includes Photos With New Strip Maps

WASHINGTON (D. C.)—Photographs of airports will be included in new charts of airlines issued by the hydrographic office of the Navy Department, as well as with older charts when they come up for reprint. The first chart to be made with the accompanying photographs was issued Oct. 28, and covered the territory bordering the coast between Cape Henlopen, Del., and Long Island, N. Y. It contains photographs of 24 airports, with a portion of the surrounding country.

Similar charts for the territory between New York and Boston, and Boston and Eastport, Me., will be ready by Nov. 15, the first being a reprint with photographs, and the second a new chart. A third chart showing the territory between Wilmington, N. C., and Miami, Fla., is in preparation. It is believed that the photographs will provide pilots with a much more serviceable knowledge of the contours of airports than the sketches which have been furnished heretofore. The photographs should also provide a much easier means of identifying airports for pilots who wish to check their location.

Gettysburg Meet Draws 20,000

GETTYSBURG (PA.)—Maj. Gen. James E. Fechet, chief of the Army Air Corps, was among a crowd estimated at 20,000 which attended the recent air program held here at the Gettysburg Airport, Oct. 19 and 20. Five cup trophies were awarded for the various events. Of this number, two fliers received two apiece, namely, J. Shelly Charles, Richmond, Va.; and Henry Little, Norristown, Pa. The former was awarded one cup for his exhibition flying and another for placing best in the dead-stick landing contest. Little won the 15-mi. race for planes with engines of 510 cu.in. displacement, while he also came in first in the free-for-all race. J. Morgan Harding, second in the same race, was awarded the fifth cup. "Thunderbolt" Knight, Baltimore, Md., made parachute jumps.

Air Mail Rate Case Remains at Standstill

WASHINGTON (D. C.)—No action on the air mail contract situation was expected until Nov. 6, due to the absence from the city of Assistant Postmaster General W. Irving Glover. A termination of the conferences was hoped for at that time.

A proposition for the carrying of transcontinental air mail by rigid dirigibles has been submitted to the Post Office Department by Walter Link, of this city, president of the American Airship Association, Inc. The rate proposed is $3 a pound over all or a portion of the line, and in any amount up to an aggregate limit of 10,000 lb. per trip. Mr. Link's proposition calls for a two-way service throughout the year, ships leaving Baltimore and Los Angeles daily except Sunday, and with a reversal of direction of travel on alternate days. Trip time is estimated at 36 hr.

This proposal of the American Airship Association, Inc., is the second which has been received by the Post Office Department for a southwestern air mail route, the first having been made by Southern Skylines, Inc. and Southwest Air Fast Express, Inc. As the hearing on the route will not be held until Nov. 25, the evident interest shown in it should bring forth extremely close bidding. However, with the experience of the past years to guide them, it is doubtful if operators will cut their bids as far down as many of those offered in the past. Bids as low as $.13 a pound have been received. Contracts based on such low rates have proved nearly ruinous to operators.

This offer was made without solicitation of the Department and no consideration is being given to the supplanting of planes by dirigibles for mail transport with the country.

Colonial Orders Ice Warners

NEW YORK (N. Y.)—Colonial Air Transport, Inc., has ordered five ice warning devices from Moto Meter Gauge & Equipment Corporation, Long Island City, N. Y. The instruments are to be installed on a strut and connected to a dial in the cockpit which warns the pilot of the possibility of ice forming on the plane's wings. They will be used on Colonial's New York-Boston mail route.

Erect 17 St. Louis Air Markers

ST. LOUIS (MO.)—Seventeen air signs for aviators pointing the route to local flying fields have been erected in and around St. Louis within the past year or so as a result of a campaign by the Chamber of Commerce.

To Open United Airport on Dec. 1

BURBANK (CALIF.) — With operations of the Pacific Air Transport mail planes to be based on the new United Airport here starting Nov. 1, the field is scheduled for dedication and opening to general use Dec. 1. Hangars 1 and 2 have been completed. Foundations have been poured for the passenger terminal building and work is being rushed on this project. This structure also serves as administration building for the airport, with a dining room, lunch room, kitchen, waiting room, baggage room, telegraph and telephone headquarters, rest rooms, a large display room for aeronautical products, weather bureau and meteorological observatory, five office rooms and a storage department all located on the large main floor, which is laid out on the arc of a circle to give the building a modernistic effect.

The second floor provides a spacious observation deck over each wing of the main building, with a large enclosed room in the center or tower portion of the structure. The third and top floor is roofed over but open to the air on all sides to provide an observation deck from which airport activities may be directed. The entire building is approximately 61 ft. wide and 203 ft. long. Construction has also been started on two manufacturing plants.

Maddox Specializes on Passengers

LOS ANGELES (CALIF.)—Passenger business will be the foundation for all Maddux Air Lines traffic development, according to a recent statement by Jack Maddux, president. Although the Maddux lines have never sought mail contracts and plan to avoid the carrying of mail, this company carries air express under contract with the United Air Express Company. Figures for the months of July, August, and September, indicate an increase of 176 per cent in the total of aerial express carried each month. During July 372 lb. of express were carried by air, 447 lb. during August, and 655 lb. in September.

Baltimore-N.Y. Service Starts

NEW YORK (N. Y.)—Passenger and light freight service between this city and Baltimore, Md., was inaugurated Oct. 28 by Baltimore Airways, Inc., of which Edward Handler is president. Handler Field will be used as the terminal in Baltimore, and Newark (N. J.) Airport at this end of the line. Planes leave Baltimore daily at 9 a.m. and Newark at 3:30 p.m., completing the trip in one hour and a half. Fare is $25 one way or $40 round trip. Two Bellanca planes are used.

Announce Curtiss Plans For San Mateo

SAN MATEO (CALIF.)—Details of the new Curtiss Airport and Flying School to be built near this city, have been announced by Capt. F. M. Bartlett, manager of the Curtiss-Wright Flying Service and representatives of the Curtiss Airports Corporation. This airport will consist of two units. The first will be the flying school with classrooms, pilot club, dormitories and garages, occupying the extreme southern corner of the field. The second unit will be used for commercial flying.

The field, an irregular quadrangle, will be crisscrossed with five runways, permitting landing into the wind, no matter what its direction. The longest runway, a diagonal from one corner of the field to the other, will be 4,600 ft. long.

Among buildings to be erected on the commercial unit of the airport, according to present plans, are a casino, houses for concessions, five large hangars, a repair base, power house, cafeteria, a promenade for spectators and parking space for automobiles. Construction work on the new field will begin soon.

Goebel Takes Over New Field

KANSAS CITY (KAN.) — The Art Goebel Flying School here, has arranged for an auxiliary 160-acre airport near Liberty, Mo. The field also will serve as a municipal field for Liberty, citizens there gave $6,000 for its development.

Los Angeles Municipal Airport Adopts Spanish Style

THIS recent photograph of the new buildings at the Los Angeles city airport, shows the Curtiss Flying Service hangar at the left, the airport restaurant in the center and the administration tower and hangar space for visiting planes on the right. Spanish mission architecture has been adopted for all the buildings at the airport. Eventually the present administration quarters will be replaced by a complete administration building.

Air Transport Section Holds First Conference

WASHINGTON (D. C.)—Representatives of the 25 lines affiliated in the newly formed Air Transport Section of the Aeronautical Chamber of Commerce met at the Chamber's headquarters here Oct. 25 to formulate a program for the Section's activities. Some of the work previously conducted by the Chamber, such as that of the technical radio subcommittee for transport operators, and a survey which has already secured endorsement of air travel for their representatives from more than 70 firms, was taken over by the new Section. The Chamber was also authorized to collect statistical data on air transport operations, and a questionnaire, to be sent out to the various lines monthly, is being prepared.

A special committee consisting of Col. Halsey Dunwoody, Col. Paul Henderson, and P. G. Johnson was appointed to study insurance problems. It was the sense of the meeting that the traffic studies, begun at the National Air Traffic Conference at Kansas City, should be continued. The present executive committee of the Air Transport Section is: Harris M. Hanshue, Western Air Express, chairman; Col. Paul Henderson, Transcontinental Air Transport, Inc.; Col. Halsey Dunwoody, Universal Air Lines System; P. G. Johnson, Boeing Air Transport, Inc.; Stanley Knauss, Stout Air Lines; Col. Thomas B. Doe, Pitcairn Aviation, Inc.; Col. L. H. Brittin, Northwest Airways, Inc.; J. T. Trippe, Pan American Airways, Inc.; and Maj. Gen. John F. O'Ryan, Colonial Air Transport.

Get Savoia For West Coast Line

LONG BEACH (CALIF.)—A fourteen passenger, twin engined Savoia-Marchetti flying boat has been received by Aerco, Inc., of this city, and will be used as one of several such units to be placed in a coastal service according to the announcement of John McAbrams, organizer of Aerco, Inc. The new firm, still in the formative stage, plans an extensive coastal service touching all large coast cities between San Diego and Seattle. The itinerary of regular trips probably will include San Diego, Los Angeles, Santa Barbara, Monterey, Santa Cruz, San Francisco, Eureka, Crescent City, Portland, and Seattle. This project is backed by prominent oil and shipping interests.

N. Y. & Rio Gets Chile Concession

WASHINGTON (D. C.)—The Chilean government has granted a concession to the New York, Rio & Buenos Aires Line, Inc., for the transportation by air of up to 25 per cent of the country's mail to Argentina, Brazil, Uruguay, West Indies and the United States. Regular air passenger service between New York and South America is expected to begin Jan. 1. A similar concession has been granted the French Companie Generale Aeropostale.

AIRPORT CONSTRUCTION PROJECTS

Central

CURTISS-WRIGHT Flying Service has let contracts for steel equipment intended for the new warehouse, sales room and ground school being established at 1918 Washington Avenue, St. Louis. Contracts also will be let soon for equipment for new hangars under construction at the new Curtiss-Steinberg Airport. David Lupton Sons Company, Philadelphia, airplane hangar manufacturers, will equip the St. Louis Curtiss-Wright buildings with the same standard type of fixtures that have been installed by the company in all Curtiss-Wright bases in the country.

Council Bluffs, Ia., probably will postpone the issuing of $80,000 in airport bonds recently voted by the city council for the establishment of the city's second airport. The delay was advised until there is a better margin for the financing at a later date.

Goebel Aviation Company, Commerce Building, Kansas City, Mo., of which Conrad H. Mann is president, has leased a 160-acre tract northeast of the Courtney Bridge, Liberty, Mo., for an auxiliary instruction field, and it will also be used as municipal airport for Liberty.

By a vote of 289 to 97 the citizens of Norton, Kan., voted for a $40,000 bond issue, the money to be used for purchasing and improving a tract of land, for an airport, close to the city. The Curtiss company, of Denver, and the Skelley Oil Company, of Tulsa, have offered the promoters free engineering service in planning the lay-out.

Woods Brothers Corporation, 407 Security Building, Kansas City, Mo., is having plans prepared for 50x200 ft. airplane factory to be located at Rosencrans Field, St. Joseph. The company is also planning for construction of an administration building at the Atchison Fairfax Airport, Atchison, Kan.

South

Plans are being drawn for a $75,000 addition to the Good & Foster hangar at Love Field Airport, Dallas, Tex. The present hangar is 60x100 ft. The new addition will consist of a hangar large enough to house Fords of the Southwest Air Fast Express company, which has been operating from the Good & Foster hangar.

At Tampa, Fla., a barge has been painted chrome yellow and black, towed to the foot of Ladoga Ave., Davis Islands, and will be used as a temporary municipal seaplane base.

An expenditure of $40,000 on extensions and widening of the municipal airport runways at Amarillo, Tex., has been decided following the visit of B. A. Slater, S. A. T. engineer. Present asphalt runways will be lengthened and oil runways will be replaced with asphalt.

With the letting of sub-contracts recently by Murch Brothers Construction Company, work was to have started last week on the excavation part of the $1,233,000 development project for Randolph Field, San Antonio. It is expected that about a year will be required to complete six barracks, a quartermaster's warehouse and an Air Corps warehouse.

Ground breaking ceremonies for the new Curtiss-Wright Fort Worth-Dallas Flying Field were conducted Oct. 30. Approximately $75,000 will be expended in improving the field. A 30-plane hangar and an administration building will be erected. Headquarters for the sales, flying school and servicing activities of Curtiss-Wright in this section will be maintained at the field.

A $15,000 hurricane-proof hangar has been completed for the Viking Flying Boat company at the Venetian seaplane base, Miami.

West

In spite of two bond elections for San Jose (Calif.) Municipal Airport having resulted in defeat, it is planned to attempt a third bond issue in the near future. The San Jose field is located at Alum Rock and Capitol Avenues, and is an excellent site as thought by various authorities.

When the new hangar is finished, the four hangars leased from the city of Cheyenne by Boeing will be converted into repair shops. Under the terms of the company's lease, it has located its transcontinental route operating and administrative offices in Cheyenne, also shops for overhauling and repair of ships.

The bonds recently voted by Yuma, Ariz., for $25,000, will be issued at once, and the proceeds will be used in construction of hangars, runways, lighting system and machine shop at the municipal airport.

Little Rock has sold its $200,000 bond issue for the construction of a new municipal airport and building is expected to start soon.

Airport Industries, Inc., Portland, Ore., will erect a plant at Portland Airport, to cost about $50,000, for airplane service and repairing.

East

Baltimore Airport, Inc., will begin construction immediately on a 125-acre airport which will border on Rolling Road and Windsor Mill Road. Besides Baltimore interests, the backers include C. E. Moran, Inc., investment bankers of Washington, D. C., who are also interested in Atlantic Seaboard Airways, owners of Hoover Field.

New York Air Terminals, Inc., recently bid $223,272 for an additional 37 acres for its Secaucus (N. J.) airport tract. This now includes about 1,000 acres and is being developed for a New York terminal.

Following recommendations of the Austin Company, Scranton, Pa., Chamber of Commerce, has appointed a committee to promote the proposed airport. A 180-acre site probably will be chosen for development.

Airports Discussed At Paving Conference

WEST BADEN (IND.)—Airport paving problems were discussed at the morning session, Oct. 31, of the eighth annual asphalt paving conference, under the auspices of the Asphalt Association. Uses of paving, such as for runways, aprons, hangar floors, etc.; the type of surfacing to be employed and the nature of the various problems involved, were among the subjects considered. About 100 of the 450 attending the conference were present at the airport session. Maj. Frank M. Kennedy, in charge of Air Corps field construction projects, presided.

The subject of Oiled Runways for Airports was discussed in a paper by John A. Herlihy, chief engineer of T. A. T. at St. Louis. Standard Paving for Airports was discussed by R. H. Simpson, chief engineer department of Public Services, Columbus, Ohio. An interesting description of the experimental runway work being carried on at Lambert-St. Louis Field was presented by Mark R. Thompson, engineer in charge of bituminous paving of the St. Louis Public Service Board. [This paper will be described in this section in the next issue.—ED.]

Consolidated to Open Fields

TONAWANDA (N. Y.)—Two adjoining private fields near here and close to the company's Buffalo plant will be opened this month by Consolidated Aircraft Corporation. The larger field, 126 acres, has a 3,000-ft. slag runway and a 3,600-ft. dirt runway. Hangars will be built soon. The smaller field, 26 acres, has a 3,000-ft. cinder runway and a hangar with office rooms, work shop and storage space for twenty small planes has already been erected. The larger field, to be used for testing, was drained and leveled under the supervision of the Industrial Planning Corporation, of Buffalo.

Two Lines Discontinued

CLEVELAND (OHIO) — Translake service between Cleveland and Detroit operated by Thompson Aeronautical Corporation has been discontinued for the winter months, effective Oct. 12. Early next summer, the company plans to resume operation of the passenger and mail line with a schedule of eight trips daily in each direction. Amphibion planes will be used, as heretofore. The Airvia line between Boston and New York, also has been discontinued.

State Erects Ohio Air Markers

COLUMBUS (OHIO)—According to a recent decision by the attorney general of Ohio, the state director of aeronautics has authority to provide an air marker for any municipality which fails to establish one, and to charge the cost up to $25 to the municipality. It has recently been announced that Ohio has 400 air markers.

FOREIGN ACTIVITIES

Imperial Airways Has Favorable Year

LONDON (ENGLAND) — The annual meeting of Imperial Airways, Ltd., was held on Sept. 25 with Sir Eric Geddes, chairman of the company, presiding. According to the report, the company is in a much better financial position than ever before and operations have increased satisfactorily.

Airplanes and engines built by the company are valued on the books at $1,125,000. While no new planes have been put in service during the current year by the company, about $320,000 have been paid on machines under construction. One of these is a new Short Calcutta flying boat for the India service and the seven others are 40 passenger Armstrong-Whitworth Argosies. These are powered by four engines of 500 hp. each.

Land, leases and plant equipment have increased from $215,000 in the previous year to $225,000 in value during the current year. The profit for the year was almost a 10 per cent improvement over the previous year. Payment of a 7½ per cent dividend which will absorb about $175,000, leaving a total of about $30,000 to carry on with, was recommended. Traffic revenue on the European services had increased by 29½ per cent over the previous year while the traffic revenue on the Cairo-Bagdad-Basra service had increased 48 per cent compared with the previous year. This latter line now is a link of the London-India service. During the year the company's planes flew 1,032,342 mi. and carried 34,717 passengers, 873 tons of mail, freight and luggage. Of the capacity available, 74½ per cent was used by paying traffic on the European lines and 61 per cent on the lines in the Near East. About 92 per cent of the European trips scheduled were completed and 99.37 per cent of the service in the Near West completed.

The most profitable source of revenue has been mail and the growth of mail traffic on the India line has been steady. For the future Imperial hopes to extend soon its London-Karachi line to Delhi and Calcutta and its London-Cairo service to Cape Town.

Cuba Cuts Mail Bids to Three

HAVANA (CUBA) — Bids under consideration by the Cuban government for the establishment of a first national air mail and passenger line have been reduced to three. The offers submitted by Pan American Airways, Inc.; New York, Rio & Buenos Aires Line, and Compania Cubana de Transportes, S. A., are the three, of which one will probably be accepted.

Hold Zurich Transport Conference

ZURICH (SWITZERLAND)—An international air conference was held in Zurich, Switzerland, Oct. 21-25. Leading air transportation officials from England, Germany, France, Holland, Belgium, Czechoslovakia, and the Saar District attended. Mr. Isler, director of the Swiss Federal Air Office, presided. The main topics of discussion were management and organization, wireless service, and weather bureau service.

Lloyd's to Inspect Planes in England

LONDON (ENGLAND) — Last summer it was arranged for the inspection department of the British Aviation Insurance Group to make an inspection every three months of light English aircraft. Reports of these inspections were to be studied by the Air Ministry at the close of the year and if they prove satisfactory Airworthiness Certificates of light planes would be renewed. This relieved the Air Ministry of a great deal of its previous inspection work.

It has now been arranged for a committee of Lloyd's Register of Shipping to take over the work done by this British Aviation Group. An inspector bearing the title of Lloyd's Surveyor of Aircraft has been appointed and this man is the one who has been doing the work previously for the insurance group. Beside the strictly renewal inspections the department will be available also for the inspection of damaged planes. It is reported that a very strong committee is being drawn up at Lloyd's to administer this work, including representatives of insurance underwriters, aircraft builders and aircraft owners.

French Cut Aviation Budget

PARIS (FRANCE)—Estimates prepared by the French Air Minister to be included in the budget for next year, totaling about $77,000,000, were considerably reduced at a recent session of the Finance Committee of the Chamber of Deputies. About $8,000,000 was approved for subsidies to commercial aviation, (a reduction of about $350,000 from the previous year) and $200,000 for next year's light plane competition. This latter figure includes allowances for premiums to facilitate private light plane purchases. Another $200,000 for the establishment of a national aircraft factory was recommended. These estimates are subject to the action of the Chamber of Deputies and may be influenced by the change in the cabinet. It is probable, however, that M. Eynac will retain his position as Air Minister.

Germans Hold Light Plane Tour

BERLIN (GERMANY)—On Sept. 27-29 the German Aviation Union carried through for the second year running its reliability tour for light planes with amateur pilots. The union, which has about 16,000 members throughout Germany, is badly in need of funds and hence had to abstain from awarding prizes to the victorious competitors. The number of machines was limited to 35 for the same reason. However, the union found means to grant each plane a mileage subvention averaging about $.19 for each kilometer flown in schedule time.

The greatest distance was covered by Muller, of Dessau, in a Junkers Junior with 80 hp. Genet engine. Among the participants making perfect scores was Helmut Hirth, famous flier of pre-War days, who was said not to have flown since 1914.

As no fewer than 50 machines had been entered fifteen had to be struck off the list, which was done in accordance with the regulation of the competition, that machines of wholly German origin be given preference. The planes taking part had engines with an output between 20 and 85 hp. Twenty-three of them were Klemms, five B.F.W-M 23b, two Focke-Wulf "Kiebitz," three G.M.G. and two Raab-Katzenstein "Grasmücke." The makes of the engines represented were: Thirteen Daimler-Benz (20 hp.); seven Siemens SH 13 (80 hp.); eleven Salmson (40 hp.); and four Anzani (35 hp.). The entrants were twenty clubs belonging to the Union and fifteen private owners.

Replace Pilots and Observers

The machines had to touch at 54 German airports. Start and finish was not at a central point for all machines but each machine started and finished at its own port. Each machine was called on to do 15 hr. flying (about 5 hr. per day) at its normal travelling speed. Pilots and observers had to be replaced at frequent intervals so that as many members as possible should take active part in the trial. Many German towns offered special cash awards or gave other financial support to the Aviation Union.

On the first day of the trial 33 machines out of the selected 35 started. Of the 24 finishing, 22 had not a single bad mark against them, which is a great improvement over last year's results, as then only four out of 40 machines had completed the trial without bad marks. The organizers ascribe this to the careful training that is now being given to the members of the union in the various centers.

Long Range Flights Considered in Europe

LONDON (ENGLAND)—Following the recent brilliant distance flight of Costes and Bellonte, long range aircraft and distance records have been attracting more than usual attention. It has been announced in Paris that the design departments of several aircraft firms are preparing long range planes to surpass the record recently made by Costes, and it has been reported in London that the Fairey monoplane, which made the 4,290-mi. London-Karachi flight in April, is being groomed for another attempt to set a distance record.

The French planes are being developed in secrecy, but a few details of at least one machine have been learned. This machine is to be a new cantilever monoplane, designed by the well known engineer, M. Dewoitine, who has produced several pursuit types. The wing is placed low down on the fuselage and has a trapedoizal plan form. It is of duralumin construction. It has a span of 92 ft., a wing area of 810 sq.ft., and weighs empty about 4,800 lb. Its fuel load is placed at 13,200 lb., and speed about 125 m.p.h. It is expected that the machine will have a range of more than 6,200 mi. in still air. According to present plants, it should be ready in April and a distance attempt is planned for next summer.

Fairey Machine Described

Some of the characteristics of long range craft in general and of the Fairey machine in particular were described recently in a lecture by C. R. Fairey, the designer and builder, in which he included the military as well as commercial desirability of long range machines. This Fairey machine, he said, was designed for a range of 5,500 mi. A water cooled engine was chosen on the ground that the increased weight entailed by the water installation was the lesser evil in comparison with the frontal resistance of the air cooled type. A monoplane was chosen because of its adaptability to streamlining. The cantilever type was selected because of the thick wings providing for the housing of fuel, oil and reserve water. One engine was selected, because of the low drag involved.

Touching on the part parasitic resistances play in developing the long range machine, Mr. Fairey stated that if the undercarriage could be folded against the fuselage, or in other ways removed from the air stream, the range of the Fairey machine could be increased by more than 1,000 mi.; but about 300 mi. would be lost by the mere addition of air driven dynamos. It has a span of 82 ft. and an aspect ratio of 7.5. Fuel tanks have a capacity of 1,157 gal. The reserve oil tank holds 85 gal., and the reserve water tank 35 gal.

In the flight to Karachi, the plane was loaded with 1,043 gal. of fuel, a total weight of 7,620 lb. The machine took off with a run of 1,135 yd., and in 5 min. had reached an altitude of 1,000 ft. In 15 min. it had climbed to more than 2,000 ft. There were 82 gal. of fuel remaining in the tank at the conclusion of the flight. The engine was throttled to 420 b.hp. and about 4.4 miles per gallon was achieved.

Increase in range in the future, according to Mr. Fairey, may be obtained through elimination of the resistance of under carriage and radiator. Fuel consumption reduction also offers possibilities, notably the efficiency to be expected from the oil burning, compression-ignition engine. An engine of 1,800 hp. with the same power weight ratio as the Napier Lion now used would also have a great influence.

The maximum range of a pursuit plane does not exceed 400 mi.; two place reconnaissance 600 mi., and troop carrying planes 1,200 mi. Commercial aviation, especially as far as England is concerned, has need for a longer range, since the nearest British territory to England is Malta, 1,300 mi. away. It would seem desirable, therefore, to develop a commercial plane having the range of about 2,000 mi. This would mean that the 1,300 mi. to Malta, the next 1,100 mi. to the Suez Canal, and the 1,350 mi. from there to India each could be covered in one jump.

Inspect Europe-Madagascar Line

PARIS (FRANCE)—Two French pilots and a mechanic left Le Bourget Oct. 17 in a Farman 190 monoplane for a survey flight over the air line to Madagascar, which is being developed jointly with Belgium. The itinerary was as follows: Oran, Colomb Bechar, Reggan, Gao, Niamey, Zinder, Fort Lamy, Fort Archambault, Bangui, Coquilhatville, Luluabourg, Kanda-Kanda, Elisabethville, Broken Hill, Tete, Quilimane, Mozambique, across the Mozambique Channel, Majunga, and Tananarive, the capital of Madagascar.

Bolivian Mines to Use Planes

LOS ANGELES (CALIF.)—The Bolivia Gold Exploration Company, with home offices in this city, has announced that planes will be used to transport supplies to and gold bearing ore from the company's gold bearing property on the eastern slope of the Cordillera Real Mountains, Bolivia, South America. Plans for establishment of the air transport service are in the hands of Maj. Owen R. Bird, and Lieut. Comdr. Perry Wood.

Argus Develops New Engine

BERLIN (GERMANY) — An inverted four-cylinder in-line 80 hp. engine is the latest product of Argus Motoren Gesellschaft, a company which has comparatively recently re-entered the aviation engine field after having deserted it for nearly ten years. The new engine weighs 247 lb. It is equipped with "Sum" carburetor and two Scintilla magnetos.

Surrey A.L.I. Built For Sport or School

LONDON (ENGLAND) — The Surrey A.L.I. biplane has been produced by Surrey Flying Services for use as a two-place touring plane or as a school plane. With these two purposes in mind it was designed with a side by side seating arrangement and a generous space for the carriage of luggage. It is said to have a useful load in addition to the fuel and oil of 400 lb., allowing about 6 lb. of luggage with pilot and passenger, or 230 lb. of luggage with only the pilot.

The machine may be powered by either the 7-cylinder, 95 hp. Simpson air-cooled radial engine or the Cirrus. Dual controls are fitted with a partition, topped by an arm rest, separating the two cockpits. The throttle consists of a knob which moves straight forward and backward with a travel of about 8 in. An automatic locking device keeps it positively in the desired position.

The machine just built is of the open cockpit type, but an optional coupé roof has been designed making it possible to convert the machine into a cabin plane. It is claimed that this machine is not a "light" plane, in the usual sense of the definition.

The general specifications are as follows:

	With Salmson Engine	With Cirrus Engine
Max. speed (fully loaded)	110 m.p.h.	100 m.p.h.
Landing speed	45 m.p.h.	45 m.p.h.
Cruising speed	100 m.p.h.	90 m.p.h.
Rate of climb	1,100 ft./min.	800 ft./min
Ceiling	20,000 ft.	17,000 ft.
Range	200 mi.	200 mi.

Foreign News Briefs

Radio beacons of a new design have been perfected by William Loth, French engineer, for transatlantic nevigation of planes and ships. It is planned to erect sending stations at Cape Finisterre, Spain, Land's End, England, in Labrador, and in Florida.

Mail and freight was recently carried 1,250 mi. from Constantinople to Berlin in a non-stop flight in 10 hr. 10 min. by an Arado-V fitted with Pratt & Whitney Hornet engine.

Luft Hansa has been testing a method of delivering and picking up mail bags by an airplane in flight, so arranged that the two operations take place simultaneously.

An attempt by M. Vancaudenbergh to better the world's distance record for light planes failed when he was forced down by fog in Germany on a projected Paris-Moscow flight. He used an Albert plane with 40 hp. Salmson engine.

Royal Automobile Club, London, will hereafter send out cars for flying members who are stranded by forced landings, as they now do for stranded motorists.

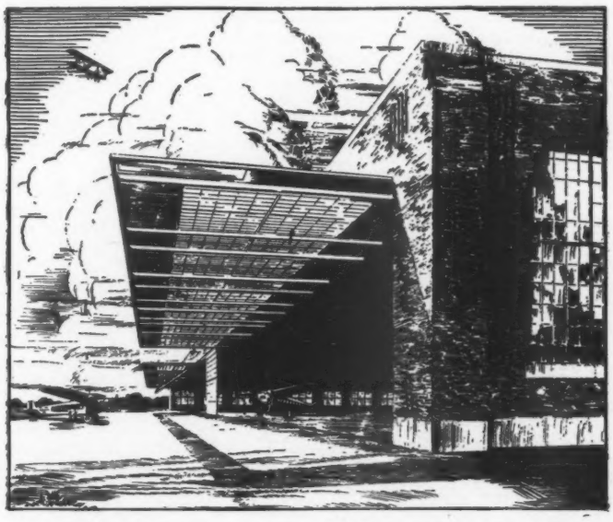
General De Pinedo has resigned as under chief of the Italian Air Force. He is replaced by Gen. Giuseppe Valle.

THE BUYER'S LOG BOOK

Austin Canopy Hangar Doors

THE Austin Company Cleveland, Ohio, is prepared to design and build at any approved location hangars ot the cantilever type recently developed by the firm, featured by "Clear-Open" canopy doors. The company's hangar at Cleveland, which was open for inspection during the National Air Races, was of this type. It provides a floor space 200 x 120 ft. with but a single column, in the center. Additions or larger units can be built to provide even greater unobstructed area.

The doors, which may be fitted to other hangars as well as to those built by the company, are hinged at the top and swing out to form a marquee extending from



A typical installation of the canopy hangar doors developed by the Austin Company

20 to 30 ft. from the building. Since there are no columns between them, they allow the complete opening of a whole side of the structure. Operation is by an individual motor drive on each door, and any or all of them, or any desired combination, may be opened or closed simultaneously by the use of electrical control buttons. The Austin hangar at Cleveland was built complete in 29 working days.

Landing Gear Products

AMONG the products offered by the Aircraft Products Corporation of America, 7424 Melville Avenue, Detroit, Mich. are tail wheel and shock absorbing units manufactured in designs to accommodate various loads and most convenient installation on airplanes. The tail wheels are in three sizes, 10x3, 14x3 and 13x5, and are equipped with roller bearings and grind axles to reduce wear and attention of lubrication.

Oildraulic shock struts for landing gear are made to desired length and load capacity and furnished with terminals, complete for installation. Front gear wheels of the wire type without brakes are manufactured with size 24x4 standard drop center rim having hub dimensions $1\frac{3}{8}$ dia. x 5 and $1\frac{1}{2}$ dia. x 6. The size 26x4 wheels have standard clincher type rim with hub dimensions $1\frac{1}{2}$ dia. x 6. Wheels with brakes are supplied with the internal expanding type, full floating with two cast aluminum shoes, controlled by lever for cable or rod attachment, and manufactured in sizes 24x4, 30x5, 32x6 and 36x8.

Wheel bearings are of the anti-friction type with standard bronze bearing to accommodate various axle sizes. A hydrojack and oildraulic shock absorber assembly is manufactured for retractible landing gear of the amphibian type airplane. This unit is operated by oil pressure for expansion and contraction and supported by shock absorber for dry landings.

Blount All Purpose Grinder

TO MEET the need for a tool grinder for use in the wood shop or general shop the J. G. Blount Company, Everett, Mass., has produced an all purpose tool grinder driven by a 1 hp., 1,750 r.p.m., fully enclosed, dust proof Westinghouse motor. This grinder is provided with three wheels. A coarse wheel, 10 in. by $1\frac{1}{2}$ in., is for general shop use and on this all snagging or rough grinding can be done. A fine wheel of the same size is provided for the grinding of tools, chisels and plane irons. To facilitate these operations, this wheel is provided with a special rest, fully adjustable as to angle with wheel face, to which is fitted a screw feed sliding-clamp block for holding the tool and guiding it square across the wheel. This attachment assures the rapid grinding of tools to correct angle and curvature. For the grinding of gauges and inside curved tools, a grinding cone is provided.

The Blount grinder

This machine is of the motor-in-head type. The spindle is extra heavy and runs in heavy duty deep groove ball bearings. Double recessing of flanges provides a double seal against grit and dust entering either the bearings or the motor. The Westinghouse motor is of special design for this service, and operates with low current consumption. The wheels are fitted with fully-enclosing, approved safety guards that are fully adjustable to wheel wear. The tool rests are also adjustable.

WHAT OUR *Readers* SAY

Airplane Command

TO THE EDITOR:

Your editorial in the August 10th Aviation, "Who Commands An Airplane?" was read with considerable interest.

My feeling on the question is that there has already been too much effort to show direct analogies between the airplane and other forms of transportation. We hear so often the question whether the airplane will or will not occupy a place similar to the automobile. We have six forms of modern transportation that have been used for public carriers, namely, the steamship, locomotive, bus, street car, dirigible and airplane. Each is comparative in certain respects to all of the others. Each is distinctive and possesses a field of its own.

The command and control of each type of vehicle has been determined by the practical requirements of each, and it is reasonable to suppose that the question of command aboard airplanes will follow from experience. As you point out, the high speed and maneuverability of aircraft require the minimum lapse of time between command and execution. But there will undoubtedly be airplanes of relatively ponderous type, deliberate in action and requiring, like some of the larger ocean going vessels, considerable time and space for maneuvering. The proper handling of such ships will involve such manifold activities that it will be necessary to free the directing executive from the duties of operation and leave his attention clear to coordinate various operating functions of his craft.

We are already at the point where four distinct functions appear. There is the pilot, who controls the actions of the airplane, the engineer, who must answer for the satisfactory functioning of the power plant, and the steward or conductor, who confines his attention to the comfort and welfare of the passengers. The fourth man who will be necessary on the larger boats is the radio navigator who will receive and send out such information as is necessary under various circumstances and it would seem that we are already in need of a chief executive to exercise command of the activities mentioned.

It seems too bad that the grand and glorious feeling of being in complete control in the free untrammelled air must be partly sacrificed to the dictates of commercial operation. In the last war each pursuit pilot was more or less a flying knight. Since that time the art of formation flying has been perfected and in any future wars there will be few spectacular soloists, for the hit or miss results of single handed warfare will be put aside for the more systematic plan of group action.

The optimistic view is that the very commercialism which limits the pilot's activities will in turn support an industry that can make better and cheaper airplanes available.

LESSITER C. MILBURN
2nd Vice-President-
Chief Engineer
Glenn L. Martin Company
Baltimore, Md.

• • •

Stock Models and Racing

TO THE EDITOR:

I have read the article by Casey Jones on "The Value of Airplane Racing and the Stock Model," which appeared in the August 24th issue of AVIATION, and I believe that you will find that Mr. Jones in this article expresses the sentiment of a good part of the industry.

Prior to this year's national air races, we sat down and studied the enormous racing program and decided that the prizes available for any one event certainly did not warrant the building of the special racing equipment necessary to assure winning such an event.

We are quite sure that it would take something beyond standard stock models to compete in a national affair of this kind.

The old question "what is a stock model" is a difficult one to answer. Last year's Transcontinental Race was won by a new stock model Waco, but which appearing as a new model was not viewed as a stock model by some of our competitors, even though since the Race it has been quite successful commercially as a stock model.

But to go back to Cleveland, I think it will be admitted by everyone that the crowd did not come out to see the Races, in fact the crowd did not know very much about what was going on in the Races. The crowd came out to see and listen to the pursuit group dive at the field, and the crowd came out to see the big dirigibles and the beautiful formation flying, and you may not admit it, but the crowd came out to see the stunt flying too.

I certainly agree that the value of racing in the sale of commercial aircraft is very rapidly diminishing, at least as far as the National Air Races are concerned.

A study of the less prominent racing events such as the county fair, aircraft races, etc., will show that ordinary stock models are raced in such events, and the results of such races have been influential in the sale of the winning stock models, but when the prizes get big, then it becomes worth while to alter the ship for racing and to pep up the motor, and do all sorts of things to get a speed advantage.

In conclusion, we believe that it will be worth while to give consideration toward the arrangement of an annual air show that will have sufficient publicity value to warrant the expense incurred by each manufacturer, and at the same time will have enough attraction to the crowds to warrant their attendance.

R. E. LEES,
Sales Manager,
Waco Aircraft Co.,
Troy, Ohio

• • •

The Lightning Hazard

TO THE EDITOR:

Recent accidents rumored to be chargeable to lightning bring to mind others in the past in which that was the apparent cause.

It is entirely possible that an airplane passing with high velocity through the air in a thunder storm area, will attain a powerful electrostatic charge. A gasoline tank truck can drag a chain upon the roadway to dissipate an electric charge. Some method must be invented for preventing or dissipating electrostatic charges on the airplane, so that it will not act as a focus for lightning.

From observation of the big Transport Planes in use in the Rocky Mountain Region, it seems that the materials of construction may have an important effect on lightning hazard.

MYRON S. HUCKLE.
Edgartown, Mass.

• • •

Air Transport and the Railroad

TO THE EDITOR:

In my opinion, the leading editorial in your issue of September 28, entitled "Railroads take Alarm," gives aviation more credit for the faster railroad passenger service than air transport is justly entitled to receive.

For instance, you mention that "between New York and Chicago the eighteen-hour train is no more, but in the future the number of twenty-hour services each way is to be nearly a dozen, instead of two, as it was last week."

You apparently forgot that there is no passenger air transport service between New York and Chicago.

A railroad man will tell you that the reason the Pennsylvania put on more twenty-hour trains is not because of the competition of the air transport services, but rather the competition of the New York Central. Similarly, the New York Central adopted the same course because of the enterprise of the Pennsylvania.

Faster railroad passenger schedules are being established because of the remarkable improvement in railroad equipment and railroad structure during the past few years. They are made possible by improved locomotives, improved signalling and dispatching systems, 130-pound rail, automatic train control and a general snapping up of the service. If you will talk with railroad men, you will find that what they are doing with their passenger services is nothing at all to what they are doing towards speeding up their freight services.

CHARLES W. FOSS,
Adams & Peck,
63 Wall St.,
New York City.

• • •

Indeterminate Structure Design

TO THE EDITOR:

Your publication AVIATION is read with a great deal of interest by the Deutsche Versuchsanstalt fuer Luftfahrt (German Testing Institute for Air Transportation). The writer has followed with particular interest the series of articles by Jean Fradiss and Armand Thiebolt of the Fokker Aircraft Corporation, which deal with the stress analysis of airplane wings and other indeterminate structures. These appeared in recent issues.

I regret that I do not agree with the authors in all respects. Aside from a number of errors in their general assumptions concerning the indeterminate internal and external static stresses (see page 195, July 20 issue), I wish to call attention to the self-evidence of the fact that an indeterminate internal static structure may be made determinate by fixing it to the wing base. There are likewise several erroneous fundamental assumptions in calculating the stiffening effect of the compression members on the wings.

Contrary to the opinion of the authors, the torsional stiffening effect of the spars has a definite influence on the wing stiffening. Every wing loading test has shown that a load placed outside of the elastic center will cause distortion, because the wing plane is not rigid.

It is, therefore, incorrect to state that the presence of compression members will nullify the difference of deflection Q (see page 199, July 20, 1929). For this reason it cannot be assumed that Q = O in the equations.

The influence of the true conditions has been discussed in my own article on the stiffening effect of compression members in airplane wings, a copy of which is enclosed and the subject need not be repeated here.

The effects may be summarized briefly as follows. In self-supporting wings, equipped with spars that have a constant moment of inertia with regard to bending and tortion, the installation of a rib at the end of the wing suffices to secure the maximum rigidity.

In all cases, where the rigidity of the spars decreases toward the outer end, it will be sufficient to install three stiffening ribs which should be equally distributed over the entire span and a bearing rib at the wing base. This construction will simplify the calculation, since there will be a maximum of three elasticity equations, involving three unknown quantities.

DR. ING. KARL THALAN,
Privat dozent an der Technischen Hochschule Berlin - Charlottenburg, Germany.

Editorial Comment
FROM THE DAILY PRESS

A Pointer For Birmingham

THE COMMERCE DEPARTMENT'S complaint that fliers have difficulty in identifying cities and locating airports and landing fields on account of inadequate markings should spur municipalities to make the desired improvements without delay. Especially should this announcement be interesting to local promoters of aviation who might well bear this in mind while making preparations for the municipal airport soon to be authorized by popular vote of Greater Birmingham. A community which can afford to have an airport or landing field can afford to provide markers of the kind described by the department's officials.

In the days of horse-drawn vehicles guide-posts along the highways were not as numerous or as full of information as they are now. Signs identifying communities were not as conspicuous, either. The motorist, as his car covered more and more miles with less and less need of stopping, wanted to be able to find his way about the land without halting and making inquiries. He wanted to know what town he was passing through, but didn't want to halt. So the signs increased in number and size. With the airplane, however, it is more than a matter of convenience. The motorist merely suffers a slight delay when he stops to identify a town or to obtain directions to another place. The flier, at the present development of his machine, cannot come down anywhere he happens to be and proceed on his way again without danger. The more information he can receive from signs and markers on the ground the less risk he will be required to take. Enlightened selfishness, too, would seem to prompt municipalities in all adequate ways to advertise their towns as havens for tourists of the present and future.

BIRMINGHAM AGE-HERALD.

• • •

Aerial Roof Advertising

[While *Textile World* is not "The Daily Press," the editorial reproduced below is of similar interest to readers in the aviation industry as it shows the significance accorded the airplane by manufacturers in other fields.]

WHEN, two weeks running, TEXTILE WORLD publishes items telling of important industrial corporations that have utilized the roofs of their plants for advertising purposes, it becomes evident that this new method of promotion is making rapid headway. The Standard Oil Co. of Ohio has displayed, with fabric markers, the name of the city on the roof of each of the company's plants in 272 communities. The du Pont Rayon Co. has painted the name, Waynesboro, on the roof of its plant in that Virginia city. The immediate service of these signs is to guide aviators who may be soaring past, and for the corporations concerned it means additional prestige.

Viewing the proposition broadly, it is apparent that the roof of the industrial plant is coming to have a new value and significance. Already, a few textile plants have been pioneers in this direction and have painted the names of the community on their roofs. It is stimulating to the imagination to ponder just what the future holds in this direction. With the swift development of flying, and the ever-increasing number of persons using this means of transportation, it is clear that aerial advertising will have a direct commodity value eventually. The first step has been taken, in using the roof as a guide to the pilot. Obviously, the next thought would be to tie up the name of the company, or its products, with that of the city itself. Then, the question arises, why not address the passengers in the plane? If the pilot

will look down, to locate his bearings, it stands to reason the business man who travels by air will do likewise; thus a growing public presents itself to the mind's eye, as a sales market. The development of aerial advertising suggests that before long, the sky riders who may look downward will read of the particular advantages of Blank's knit underwear, or Brown's cotton fabrics.

These are glimpses into the future, and at first blush, they may seem strange. However, they are the normal follow-up of present trends. It is inconceivable that the textile industry will fail to keep step with the times in this regard. A sales message on the roof catches the eye of the air traveler, and is bound to have effect. Every new convert to air travel means a new potential customer. This method of advertising will increase in importance as aviation itself grows; and the wideawake mill-owner will be the man who takes the lead in selling his product to this public.

TEXTILE WORLD.

Abstracts AND *Reviews*

Two Lighting Pamphlets

LOOKING AHEAD IN AIRPORT LIGHTING, *by C. E. Weitz; Bulletin 55, issued by National Lamp Works of General Electric Company, Cleveland, Ohio, Sept. 1929.*

THE DESIGN AND LIGHTING OF AIRPORTS, *by L. A. S. Wood (Manager, Exterior Lighting Section, Westinghouse Electric and Mfg. Co.); Paper presented at American Society for Municipal Improvements Convention, Philadelphia, Pa., Oct. 1929.*

REQUIREMENTS for correct lighting of airports under varying conditions and for various purposes are considered in detail in the pamphlets listed above. Each is written primarily to present recommended types of equipment necessary to meet Department of Commerce minimum regulations for class "A" rating, with further discussion of additional or improved lights desirable under various conditions.

The paper by Mr. Wood first deals with general considerations for the selection of a site and the preparation of an airport, taking up lighting in the second section. Department of Commerce requirements are given in considerable detail, and a single type of light is recommended for each of the seven items listed: beacons, wind indicators, boundary and obstruction lights, ceiling projectors, hangar floodlights and roof markings, and landing area floodlights. Estimated cost of the various items is given with a probable minimum of about seven thousand dollars to meet the bare requirements, and of about fifteen thousand dollars for the most desirable installation, including four banks of field floodlights. The portable cost in detail under normal conditions is as follows: revolving beacon, $550; 50-ft. steel beacon tower, $200; marker lights for field 2,500 ft. square, $2,500; four banks of floodlights, $9,000; wind indicator, $50-300; ceiling projector, $350; exterior hangar lighting, $15 per outlet.

Mr. Weitz presents a somewhat broader analysis of the subject with a view toward future developments rather than minimum present requirements, and he includes a considerable discussion of special problems and research in connection with airport lighting.

Airport beacons, boundary and obstruction lights he points out, have been developed rather more successfully than facilities for floodlighting, up to the present time, partly because research along similar lines has been done for lighthouses and other users of search-lights and partly because the problems encountered are less complicated. Various standard beacons with rotating mechanisms and automatic lamp-changing devices, in practically all sizes, may be obtained which will give complete satisfaction for installation at airports, emergency fields, and as markers along lighted airways.

This does not mean, however, that there is no room for improvement, and several experimental types are described. Particularly interesting are the multi-light projector as used at the Cleveland Municipal Airport, and the dome type beacon, in which the lamp and reflector revolve inside a clear glass dome. Both of these are designed to overcome the disadvantages of securing necessary candlepower by decreasing the spread of light, with the result that the beacon is not visible at long range unless a plane is directly in the beam.

The Bureau of Standards has disproved the theory that colored lights have greater visibility, particular through fog, than white, and accordingly colored lights are not recommended for beacons. They are desirable, however, for boundary and obstruction lights, especially when there is highway or city lighting near the field, and confusion is apt to result.

The bulletin gives valuable data as to the candle-power and design of lights for proper illumination of wind cones or tees, for exterior hangar lighting, and for ceiling projectors. Proper lighting of the exteriors of hangars and administration buildings is important because it furnishes pilots with perspective for judging distances, as well as for advertising purposes.

The problem of field floodlighting has admittedly not been solved with complete satisfaction as yet, and the author especially recommends that provision for future changes and additions be included in all installations made at present. The greatest difficulty arises from the fact that lights cannot be placed very high above the field, since they would then offer dangerous obstructions to air traffic. As a result, a very high percentage of the light must be in the horizontal rather than the vertical plane, and a blanket of light almost sufficient to obscure the ground may be produced.

Because of the illumination of slight irregularities, grass blades, etc., on one side, this disadvantage is much less serious when a landing is made in the direction of the beam of light rather than against it, and it is accordingly recommended that floodlights be installed at three or four corners of the field, to be lighted or left dark according to varying wind conditions. A considerable increase in efficiency may also be secured by the installation of a number of small vertical baffles or light targets, probably made of rubber like the STOP signs often found at street intersections, so that they would present no obstacle to landing. The bulletin also gives tables and illustrations comparing the light-reflecting characteristics of various surfacing materials, and recommends that the question of floodlighting should be given serious consideration when the surfacing material is chosen. Whitewashing of dark surface materials is desirable.

Other problems discussed are airport markings and hangar roof signs, airport building lighting, and airplane lighting equipment, both for landing and for the interior of cabin planes. The bulletin is concluded with a table showing the proper Mazda lamps needed in the different kinds of lighting equipment.

• • •

Safer Design Suggestions

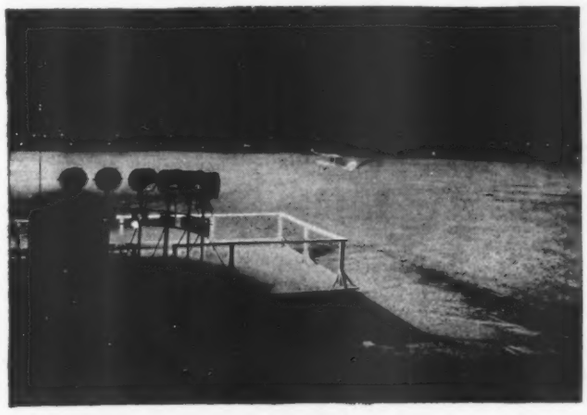
SEVERAL SUGGESTIONS for special studies which might lead to a considerable improvement in airplane design from the standpoint of safe operations are made by A. Volmerange in the August number of *l'Aéronautique*. Most interesting, perhaps, is his objection to the measurement of structural strength by static tests, since he contends that the dynamic stresses encountered in flying operate in a manner entirely different. He points out particularly that the greatest stresses are of very short duration, and might therefore be met more successfully by increasing the flexibility of the structure than by increasing its resistance to the continuous application of pressure. Such a change might lead to greater strength in the air with less weight. [This suggestion has been made in America some year ago, but most engineers regard it with great skepticism.—Ed.]

AIRPORT Lighting - -

BACKED by years of experience in the various fields of commercial illumination, Westinghouse has developed airport lighting equipment which is effective, flexible, moderate in cost, and which fully meets the requirements of the Department of Commerce for the highest rating. Westinghouse has lighted many airports throughout the country, one of the outstanding installations being the Newark Metropolitan Airport, which has been declared by experts to be the best illuminated field in the country.

Lighting Equipment

Chromilite Landing Field Floodlights
Boundary, Approach, and Obstruction Lights
Wind Direction Indicator Lights
Hangar Lights and Reflectors
Transformers
Motor-generators
Switchboards



The Newark Metropolitan Airport as illuminated by Westinghouse Lighting Equipment.

AIRCRAFT Accessories - -

WESTINGHOUSE manufactures such aircraft accessories as Micarta propellers, control-wire pulleys, fair leads, hinges, tail skid wheels, and plate for the interior finish of cabins. Micarta propellers are light in weight, free from vibration, extremely durable, and are unaffected by moisture and change in temperature. They have figured in such outstanding achievements as the crossing of the Pacific to Australia by the Southern Cross, the record-breaking endurance flight of the Question Mark, and the first flight to Hawaii by the Army tri-motored monoplane piloted by Lieutenant Maitland.

The Army monoplane Question Mark showing the right wing engine equipped with Micarta Propeller immediately after completing record-breaking endurance flight.

Accessories

Micarta Propellers
Micarta Control-wire Pulleys
Micarta Fair Leads
Micarta Hinges
Micarta Tail Skid Wheels
Micarta Plate for Cabins

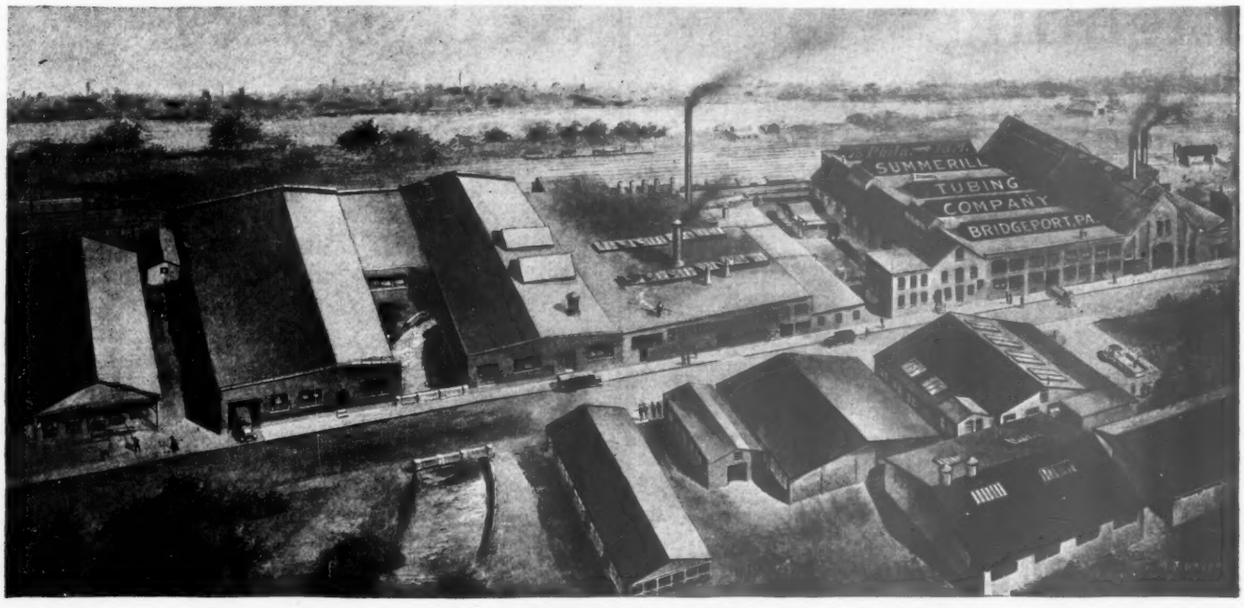
WESTINGHOUSE ELECTRIC & MFG. COMPANY
EAST PITTSBURGH PENNSYLVANIA

SALES OFFICES AND SERVICE SHOPS IN ALL PRINCIPAL CITIES OF THE UNITED STATES

Westinghouse

T 30689

The Strength of the Plane is in the Tubing



Enlarged Home Office and Factories

TUBING by SUMMERILL

Standard and Special Sections

Seamless Steel Tubing
for all Aircraft

S. L. Gabel
President

H. C. Knerr
Metallurgical Engineer

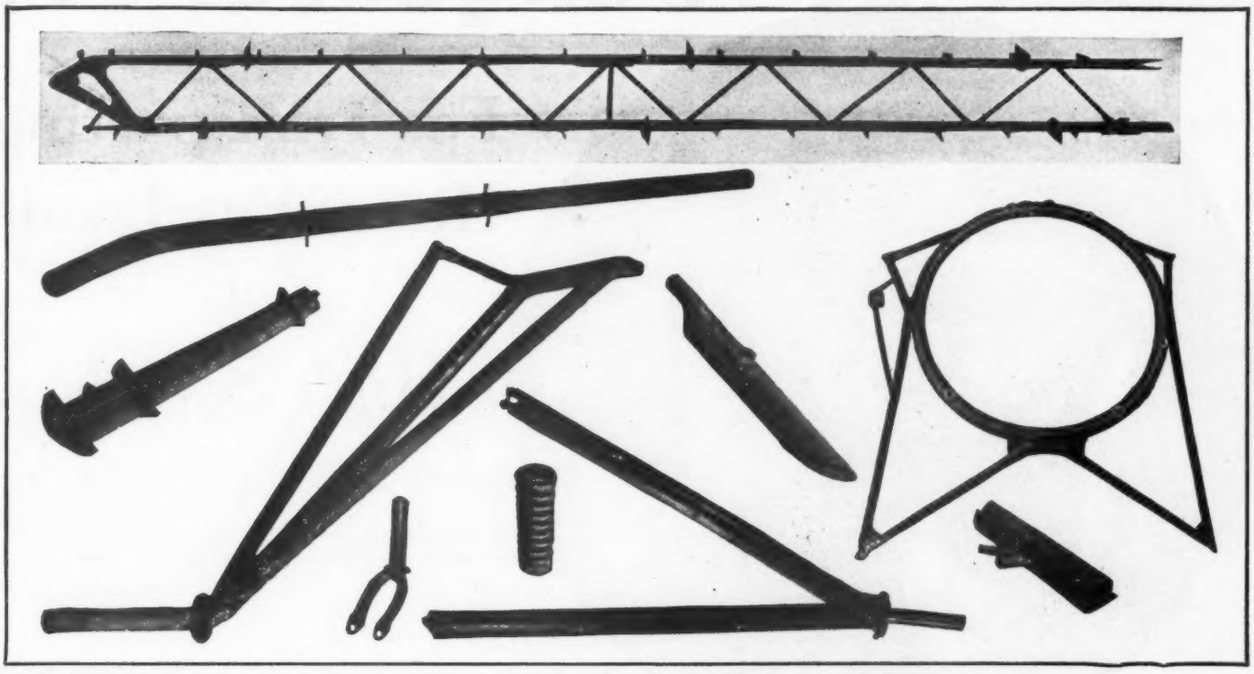
N. H. Wolf
General Manager

W. H. Baker
Superintendent

Summerill Tubing Co.

Bridgeport (Phila. District), Penna.

The Strength of the Tubing is in Heat Treating



Tubing by Summerill

Fabricating and Heat Treating by METLAB

Aircraft Parts Made and Heat Treated

H. C. Knerr, President
S. L. Gabel, Vice-President
A. H. Wilson, Jr., Secretary
M. B. Karr, Inspection Eng.
A. M. Lindsley, Production Mgr.

Vertical Electric Heat Treating Furnace

Metallurgical Laboratories, Inc.

1116 W. Montgomery Ave., Philadelphia, Pa.

THE CURTISS Conqueror . . .

For Transporting Heavy Pay Loads *at* High Speeds...

The Curtiss Conqueror *600 Horsepower Engine... the most powerful commercial engine in America.*

Curtiss Condor, new T. A. T. 18-passenger transport, and the Carrier Pigeon II, new high-speed mail plane, are equipped with Conqueror engines

IN picking engines for two of the outstanding new Curtiss aircraft developments, the *Condor* and the *Carrier Pigeon II,* both designed to transport heavy loads at high speeds, the powerful Curtiss *Conqueror* engine was finally chosen.

Because the Conqueror is a 600 horsepower, 12-cylinder, V-type, liquid-cooled engine, it has tremendous brute power . . . *spare* power as the extra safety factor so essential to transport progress at great speed.

Its very low frontal area . . . its adaptability to scientific streamlining and consequent great reduction of uneconomical parasitic drag are primary factors in giving additional speed to any equipment—and the low frontal area allows a greater range of safeguarding visibility as well.

Liquid cooling protects the engine against rapidly changing temperatures in flying.

The *Carrier Pigeon II* carries a pay load of 2,000 pounds at 151 miles an hour, with this engine. The transport *Condor,* weighing 8 1-3 tons and equipped with two Conqueror engines, has a top speed of 130 miles an hour—and has taken off and climbed on one engine in tests.

Widely used on the U. S. Army and Navy scouts, 2-seaters and large bombers—the Conqueror is now available for use in planes assigned to the toughest mail and transport jobs.

Write for full information and booklet. Dept. 00, Curtiss-Wright Flying Service, 27 W. 57th St., N. Y. C.

Sales agents for Curtiss-Robertson Airplane Mfg. Co., Curtiss Aeroplane and Motor Co., Incorporated, Ireland Aircraft, Incorporated, Moth Aircraft Corporation.

The Curtiss Conqueror *was chosen for the Curtiss* Condor, *the new 18-passenger T. A. T. transport —flying its 8 1-3 tons gross weight at 130 m.p.h.*

This engine also equips the Carrier Pigeon II, *the high-speed mail plane which in numerous flight tests carried 2,000 pounds at 151 miles per hour*

CURTISS-WRIGHT FLYING SERVICE

"World's Oldest Flying Organization"

Out of the murky drizzle a dripping ship swoops in . . . .

It crosses the line...its mate follows...and WACO places 1st and 2nd in the Fifth National Air Tour at Detroit

Above: John Livingston, in the first-place WACO, had a perfect score for every lap. *Left:* Arthur Davis and the second-place WACO.

• • •

OFF to the west of the Ford Airport a muffled hum is heard. It filters down through low-hung clouds . . . swells into a roar. Then out of the murky drizzle a dripping ship swoops in. It speeds, full gun, across the line. Another follows. And WACO places first and second in the Fifth National Air Tour for the Edsel B. Ford Reliability Trophy.

Twice in Two Years

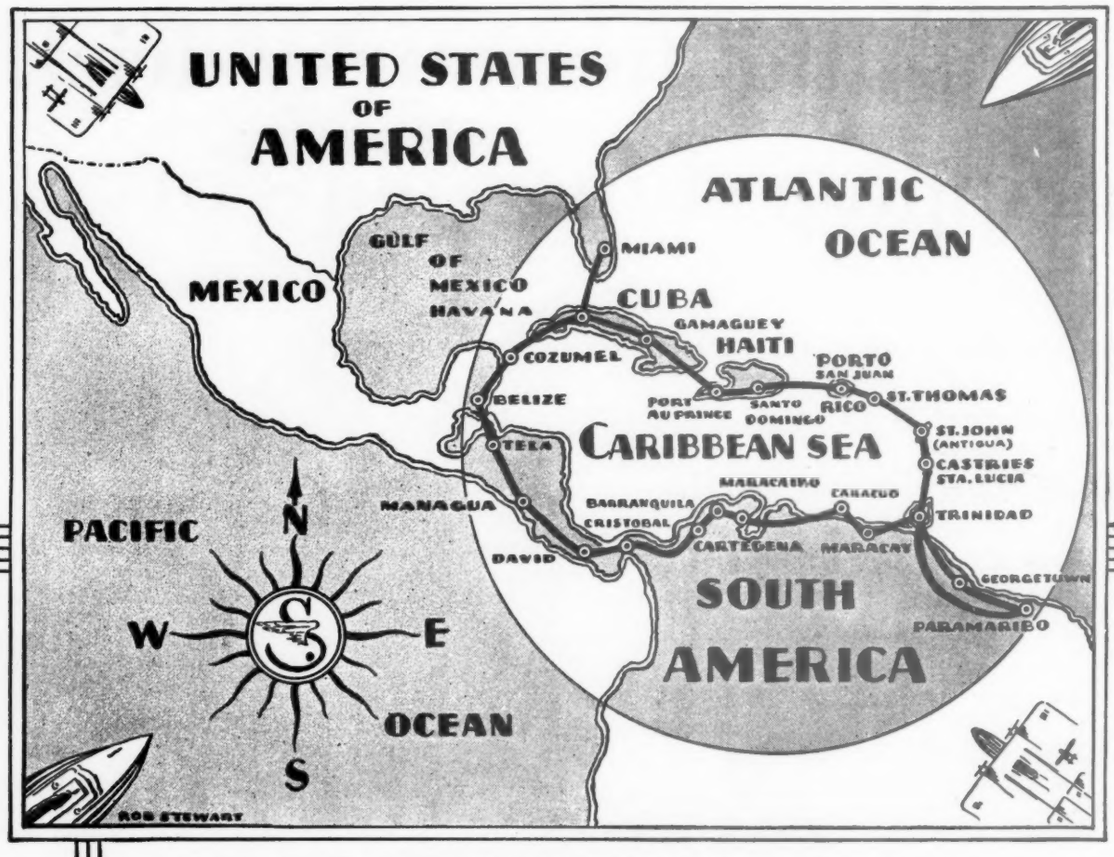
For the second time in as many years, WACO proves its superior performance in open competition. John Livingston places first with a perfect score for every lap and a total score of 45,672 points . . . a margin of 7,178 points over the next competing make. Art Davis in the second WACO totals 41,108 points . . . giving a combined total lead of 20,196 points for the two WACOs over the total point score of the next competing *pair* of entries.

These official figures prove beyond dispute that WACO is *the* ship to own and to fly . . . sturdy, dependable and *practical*. Flying at top speed with maximum useful load . . . landing in 100 feet and taking off with equal abruptness . . . these WACO "225" Straight-Wings show marked superiority over far more costly aircraft. Let us send full details. Better yet, let us arrange a flight for you. Nearly 300 WACO dealers are at your service.

THE WACO AIRCRAFT COMPANY, TROY, OHIO

WACO AIRPLANES

"Ask any Pilot"



This map shows the route covered by Col. Lindbergh, technical adviser of Pan American Airways, Inc., on his recent flight inaugurating mail service to Paramaribo, Dutch Guiana, via the West Indies. Returning, the Colonel crossed to the Canal Zone and on up to the Yucatan peninsula, exploring Maya ruins perhaps never before seen by representatives of our civilization.

Again Lindbergh Opens a New Mail Route

Trace the route of Col. Lindbergh's flight on the map above, and you will be impressed with the great distances and the varied flying conditions encountered. Over 7000 miles of the route were covered in a Sikorsky "S-38" Amphibion . . . a ship whose sturdy construction, luxurious comfort and brilliant performance are already familiar to patrons who have flown over certain of the passenger routes of Pan American Airways where they are used.

Illustrated above is the "S-38" Sikorsky, a sister ship of the Amphibion flown by Col. Lindbergh on his recent Pan American cruise. Powered with two Pratt & Whitney "Wasp" engines, this ship has a speed of over 125 miles an hour with full load.

With the "S-38" Sikorsky Amphibion

Whenever flying and landing conditions are particularly difficult you'll find the "S-38" delivering just a little more performance than is expected of her. Her low landing speed gets her into small bays and fields . . . and her fast take-off climbs her out of them. There's plenty of reserve power available. She will fly and maneuver on either engine. And her ceiling is 18,000 feet.

Truly a wonderful ship for exploration. And for business or for sport . . . an ideal combination of luxury and utter dependability.

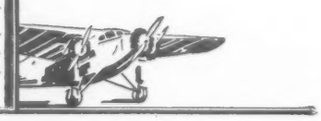
SIKORSKY
AVIATION CORPORATION
Bridgeport, Connecticut

DIVISION OF UNITED AIRCRAFT & TRANSPORT CORPORATION

Port	Line	Fare	SCHEDULE Lv.	SCHEDULE Ar.	RETURN Lv.	RETURN Ar.	Air Miles	Plane	Seats	Motor
ABILENE, TEXAS	Central-Braniff	o.w. $ 62 00 r.t. 125 00	9 00 (S.D.S.) At Wichita 6 hrs. 2 35 Or T. Okla. City	12 35	2 30 Via Tulsa or Okl. Okla. City	6 30 11 30	367 via O. C. 375 via Tulsa	Travel Air and Fokker F-10-A	5 6 12	Wasp 420 H. P. 2 Wasps 1275 H. P.
ALBUQUERQUE, N. MEX.	Western Air Express	o.w. $ 55 00 r.t. 100 00	9 35 C. T.	5 40 M. T.	12 40 M. T.	8 45 C. T.		Fokker F-10-A	12	2 Wasps 1275 H. P.
AMARILLO, TEXAS	Western Air Express	o.w. $ 65 00 r.t. 120 00	6 A. C. T.	5 40 C. T.	4 35 C. T.	9 30 C. T.		*Fokker F-10-A	12	2 Wasps 1275 H. P.
BARTLESVILLE, OKLA.	Central	o.w. $ 30 00 r.t. 60 00	9 00 A 2 10	(S.D.S.) Wichita 6 hrs. 6 10	9 00 2 30	11 30 6 30	276	Travel Air	5	Wasp 420 H. P.
BRECKENRIDGE, TEXAS	Central-Braniff	o.w. $ 54 00 r.t. 112 00	9 00 At Wichita 6 hrs. 2 35 Or T. Okla. City	(S.D.S.) 7 45	9 40 Via Tulsa or Okl. City Or T. Okla. City	6 30 11 30	524 via O. C. 537 via Tulsa	Travel Air Hamilton Fairchild	5 6 6	Wasp 420 H. P. Wasp 420 H. P. Wasp 420 H. P.
CHICAGO, ILL.	Universal	o.w. $ 56 75 r.t. 104 50	12 30	3 30	9 45	1 30	430	Fokker F-10-A	12	2 Wasps 1275 H. P.
CLEVELAND, OHIO	Universal	o.w. $ 83 50 r.t. 172 00	11 15	7 45	8 45	1 30	740	Fokker F-10-A	12	2 Wasps 1275 H. P.

From Kansas City
One of America's great air-centers
go 46 routes

OKLAHOMA CITY, OKLA.	Central-Braniff	o.w. $ 33 00 r.t. 66 00	9 00 (S.D.S.) At Wichita 6 hrs. 2 30	10 30 or 7 30	7 30	11 30	205	Travel Air	5	Wasp 420 H. P.
OMAHA, NEB.	Universal	o.w. $ 53 00 r.t. 43 00	10 15	12 05	1 30	3 00	163	Ryan Brougham Fokker Super Universal	4 6 6	Wasp 420 H. P. Wasp 420 H. P. Wasp 420 H. P.
PEORIA, ILL.	Universal	o.w. $ 48 35 r.t. 90 55	12 35 At St. Louis 1¼ hrs.	2 00	7 35 At St. Louis 2 hrs.	3 45	301	Ryan Brougham Fokker Super Universal	4 6	Wasp 420 H. P. Wasp 420 H. P.
PONCA CITY, OKLA.	Central	o.w. $ 33 00 r.t. 47 00	9 00 At Wichita 6 hrs. 2 30	(S.D.S.) 5 00	8 30	11 30	220	Travel Air	5	Wasp 420 H. P.
ST. LOUIS, MO.	Universal	o.w. $ 32 00 r.t. 60 00	12 35 1 30	2 45 3 45	7 35 11 15	10 05 3 45	225	Ryan Brougham Fokker Super Universal	4 6	Wasp 420 H. P.
ST. PAUL, MINN.	Yellow Cab Airways	o.w. $ 33 00 r.t. 66 00	9 00	1 30	9 00	1 30		Fairchild	6	Wasp 420 H. P.
SAN ANGELO, TEXAS	Central-Braniff	o.w. $ 72 50 r.t. 145 00	8 00 At Wichita 6 hrs. 2 30 Or T. Okla. City or Tulsa	(S.D.S.) 1 30	8 00 Via Tulsa or Okl. City	8 30 11 30	680	Travel Air Hamilton Fairchild Fokker F-10-A	5 6 6 12	Wasp 420 H. P. Wasp 420 H. P. Wasp 420 H. P. 2 Wasps 1275 H. P.
SALINA, KAS.	U. S. Airways	o.w. $ 14 00 r.t. 27 40	9 00	10 35	2 40	4 10	105	Flamingo	7	Wasp 420 H. P.
SEMINOLE, OKLA. Via S.A.F.E. Way Tulsa (S.D.S.)	Central-Braniff	o.w. $ 41 00 r.t. 82 00	9 00 At Wichita 6 hrs. 2 30 Or T. Okla. City 6 40 or Tulsa 5 30	(S.D.S.)	8 40 Via Tulsa (S.D.S.)	6 30	366 via O. C. 397 via Tulsa	Travel Air Hamilton Fairchild Fokker F-10-A	5 6 6 12	Wasp 420 H. P. 2 Wasps 1275 H. P.
SPRINGFIELD, ILL.	Universal	o.w. $ 40 75 r.t. 76 25	12 35 At St. Louis 1¼ hrs.	2 30	6 15 At St. Louis 2 hrs.	3 45	406	Ryan Brougham Fokker Super Universal	4 6	Wasp 420 H. P.
Subject to change without notice. For latest information call Air Travel Bureau, Harrison 5188										
SWEETWATER, TEXAS	S.A.F.E. WAY	o.w. $ 60 00 r.t. 120 00	9 30	6 40	8 15	2 30		Ford All-Metal	14	3 Wasps 1275 H. P.
TOPEKA, KAS.	U. S. Airways	o.w. $ 7 00 r.t. 14 00	9 00	9 40	6 30	6 30	56	Travel Air	5	Wasp 420 H. P.
TULSA, OKLA.	S.A.F.E. WAY	o.w. $ 22 00 r.t. 44 00	9 30	12 05	12 30	2 30		Ford All-Metal	14	3 Wasps 1275 H. P.
TULSA, OKLA.	Central	o.w. $ 30 00 r.t. 60 00	9 00 At Wichita 6 hrs. 2 30	(S.D.S.) 5 40	7 30 2 30	11 30 6 30	315	Travel Air	5	Wasp 420 H. P.
WATONGA, OKLA.	Transcontinental Air Transport	For Rates Call Air Travel Bureau	3 02	6 34	8 05	11 43		Ford All-Metal	10	3 Wasps 1275 H. P.
WEWOKA, OKLA. Via S.A.F.E. Way Tulsa (S.D.S.)	Central-Braniff	o.w. $ 45 00 r.t. 80 00	9 00 At Wichita 6 hrs. 2 30 Or T. Okla. City or Tulsa	(S.D.S.) 5 40	9 00 At Tulsa 6¼ hrs.	6 30	397 via O. C. 368 via Tulsa	Travel Air Hamilton Fairchild Fokker F-10-A	5 6 6 12	Wasp 420 H. P. Wasp 420 H. P. Wasp 420 H. P. 3 Wasps 1275 H. P.
WICHITA, KAS.	Transcontinental Air Transport	For Rates Call Air Travel Bureau	3 02	4 34	10 10	11 43	175	Ford All-Metal	10	3 Wasps 1275 H. P.
WICHITA, KAS.	Western Air Express	o.w. $ 25 00 r.t. 50 00	8 30	10 20	6 25	8 10	175	Fokker F-10-A	12	2 Wasps 1275 H. P.
WICHITA, KAS.	Central	o.w. $ 17 50 r.t. 35 00	9 00 2 30	11 00 3 30	2 30 2 30	11 30 6 30	175	Travel Air	5	Wasp 420 H. P.
WICHITA FALLS, TEXAS Via Wichita and Okla. City (S.D.S. Universal)	S.A.F.E. WAY	o.w. $ 45 00 r.t. 90 00	9 30	3 35	9 45	2 30		Ford All-Metal	14	3 Wasps 420 H. P.



And every line is powered with "Wasps"

A DAY to the west lies Los Angeles. A half day to the east—Cleveland. To Dallas in 7 hours. To Chicago in 4. Here in Kansas City, where 46 routes now converge, there has developed one of the great centers of America's new transport system—the air. A glance at the combined time-tables of these transport lines reveals a significant fact. Every single line leaving Kansas City is now using Pratt & Whitney "Wasp" engines.

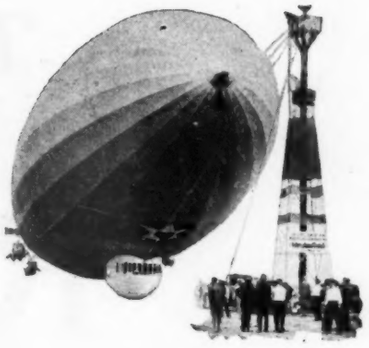
Here is a tribute not only to the unusual reserve of flying power of "Wasps." It is a tribute to the care which the great transport companies are taking to insure the utmost of dependability in every ship that flies.

THE
PRATT & WHITNEY AIRCRAFT CO
HARTFORD · · · CONNECTICUT
Division of United Aircraft & Transport Corporation

Manufactured in Canada by The Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, Quebec; in Continental Europe by The Bavarian Motor Works, Munich

Wasp & Hornet ENGINES

Speed Your Airport and Airway Construction With IDECO Equipment



IDECO steel Hangars and Airport Buildings—so popular in the East and Midcontinent are also made in the Pacific Coast plant of International at Torrance, Calif. Here too are manufactured Airway Beacon Towers, Radio Towers and other types of airport and airway equipment.

IDECO Hangars are particularly adapted to the rapidly growing requirements of present day airports. Their sectional construction permits them to be quickly and easily enlarged again and again to meet the constant demand for additional space. Being non-burnable, the fire hazard is eliminated—Completely galvanized (frames, sash, hardware and sheeting) rust is successfully avoided together with the need for constant painting and maintenance. Attractive in appearance, they can be used in any surroundings. In all that goes to make a good hangar—careful engineering, quality of materials, workmanship—they offer a value unequaled at any price.

Write for Literature and Prices.

IDECO

The International Derrick & Equipment Co.

Los Angeles, Calif. **Houston, Texas** **Columbus, Ohio**

New York **Wichita** **Tulsa** **Ft. Worth** **Beaumont** **Shreveport** **Denver** **Maracaibo, Venezuela**

The Importance of the Right Steel

Although Bethlehem has supplied many tons of fine steels and many thousands of forgings to the aeronautical industry, almost every new order brings a fresh problem.

No two parts are designed just alike or encounter identical stresses. Severe weight limitations, combined with the importance of the tasks involved, necessitate not only the use of steel of the finest quality but the *right* steel—steel whose physical and chemical properties fit it in every way to meet the stresses and other conditions it will encounter.

Airplane steels cannot be "supplied from stock"; they must be developed and manufactured with infinite care and skill in accordance with the exact nature of the task involved. It is that fact that underlies Bethlehem's success in meeting the steel requirements of the automotive industry.

At Bethlehem the builder of aircraft or engines finds complete modern facilities for making fine steels. He finds an organization that is equipped and eager to cooperate with him, and able to draw on a vast reservoir of experience in the development and manufacture of "Airplane Quality" Steels and Forgings.

"AIRPLANE QUALITY"

From long steel-making experience, including the manufacture of many tons of fine steels for the aeronautical industry, Bethlehem has developed a set of unusually rigid standards for airplane steels. Steel made in accordance with these standards is known as Bethlehem "Airplane Quality" Steel.

BETHLEHEM STEEL COMPANY
General Offices:
BETHLEHEM, PA.

District Offices:

New York	Detroit
Boston	Cincinnati
Philadelphia	Chicago
Baltimore	St. Louis
Washington	San Francisco
Atlanta	Los Angeles
Pittsburgh	Seattle
Buffalo	Portland
Cleveland	Honolulu

BETHLEHEM
"AIRPLANE QUALITY" STEELS

KILL FIRE WHILE IT IS YOUNG

A complete Fire Engineering Service for Airport Protection

No one appreciates the dangers of fire better than the men connected with airports. Here fire has a powerful chance to destroy. There's only one way to block this vandalism—correct and adequate "first aid" fire extinguishing equipment—a vital necessity to any airport.

But, adequately protecting your airport against fire is not just a question of buying one—or ten—or twenty extinguishers. There are 4 basic essentials that must be followed for correct protection—essentials which American-La France and Foamite Engineers will gladly explain to you and help you put into effect. For every airport represents a different problem, and since this company *makes all recognized types of extinguishers,* its recommendations to you can be accepted as unbiased and correct.

Send the coupon for booklet "Sinister Beacons". It describes the equipment offered by American-LaFrance and Foamite for correct fire protection for airports. American-LaFrance and Foamite Corporation, Engineers and Manufacturers, Dept. T55, Elmira, N. Y.

American-La France and Foamite Corp., Dept. T55, Elmira, N. Y.

☐ Please send me your booklet "Sinister Beacons."

☐ Please have a Fire Protection Engineer call.

Name.....

Company or City Dept......

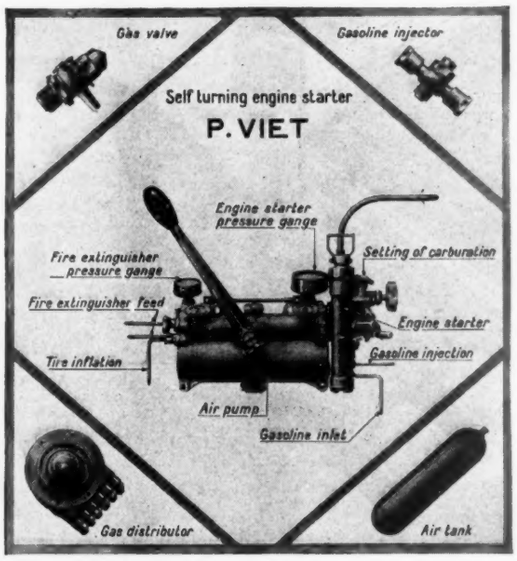
Town or City.....

State.....

AMERICAN-LA FRANCE AND FOAMITE PROTECTION
A Complete Engineering Service
For Extinguishing Fires

Self Turning COCKPIT ENGINE STARTER

The only one in the World, allowing the pilot, without effort, and by the sole means of the apparatus that there is on board, the repeated startings, by all temperatures, of one or several motors, of any power, without touching the propeller.



ITS ADVANTAGES:

Self-turning gasoline engine-starter, turning the motor to find a good flash point.

Special setting for all temperatures from —40 to +140.

Including: 1 distributor by motor, 1 standard starter for all types of aircraft, whatever the power and number of motors may be.

USED FOR:

The starting of the motor.
The Injection of gasoline into the inlet pipes.
The filling of the fire extinguisher air tank.
The tire inflation.
The pressure of the oleopneumatic shock absorbers.
The inflation of pneumatic rescue equipment.
The pneumatic landing gear brakes.
It's the lightest and cheapest engine starter, having the greatest number of usages.

P. VIET, *Factory:* 64 Avenue Edouard-Vaillant, BILLANCOURT (Seine), FRANCE

Both a Primer and Sealer

GLIDAIR

Wood and Metal Preservative (Glidnoil)

On all wood and metal surfaces, this Glidair Finish effectively seals pores of wood and metal, especially in interior tube coating and plywood. Prevents corrosion and resists water, dilute acids and all weather exposure—applied by brushing, spraying or dipping.

GLIDAIR FINISHES are:

Glidair Aluminum MixingVarnish
Glidair Flexible Lacquer Enamel
Glidair Semi-Pigmented Dope
Glidair Iron Oxide Oil Primer
Glidair Clear Gloss Top Coat
Glidair Clear Plywood Sealer
Glidair Clear Tube Coating
Glidair Clear Nitrate Dope
Glidair Clear Acetate Dope
Glidair Dope Proof White
Glidair Pigmented Dope
Glidair Ripolin Enamel
Glidair Plywood Filler
Glidair Blush Retarder
Glidair Brush Cleaner
Glidair Metal Primers
Glidair Speedenamel
Glidair Spar Varnish
Glidair Surfacers
Glidair Polish
Glidair Dope and Lacquer Reducer
Glidair Wood and Metal Preservative (Glidnoil)

For complete information write

THE GLIDDEN COMPANY
National Headquarters, Cleveland, Ohio

GLIDDEN
EVERYWHERE ON EVERYTHING
PAINTS — VARNISHES — LACQUERS — ENAMELS

Covering mechanics, servicing, designing, as well as the control and stability of a plane when in flight

The Airplane and Its Engine

By C. H. CHATFIELD
and C. F. TAYLOR

Associate Professors in the Course in Aeronautical Engineering at the Massachusetts Institute of Technology

HERE is a book for the intelligent reader who wants to acquire a sound knowledge of the basic facts and theories of the airplane, and the airplane engine.

It is a sound, clear and simple discussion of the fundamental principles, construction and capabilities of the airplane and its engine. The book strikes a mean between the simple "popular" aviation books and the highly technical book for the designing engineer.

Little mathematics has been used, and a knowledge of only elementary physics and mechanics is required. Many of the data are graphically presented in the form of curves and these are developed and explained step-by-step. There are 209 photographs and diagrams.

the book covers such topics as:

—the lift of a wing—developing the theory from Newton's laws of motion

—the reason for wing shapes

—Monoplane and biplane arrangements

—Resistance of air to bodies in motion and airplane shapes designed to reduce this resistance

—Stability and airplane control

—the engine-basic principles and representative types

—the complete power plant

—construction of the modern airplane

—types of airplane, airplane instruments and accessories.

379 pages, 5½ x 8
209 illustrations, $2.50

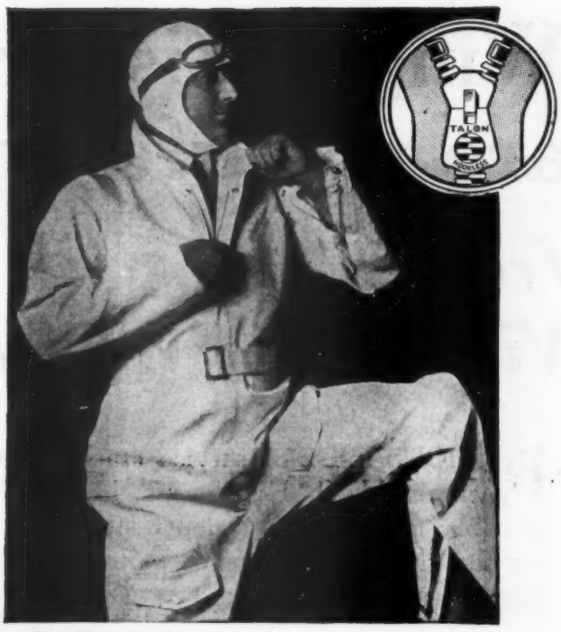
SEE YOUR COPY FOR 10 DAYS FREE

Simply mail the coupon for your copy. No obligation to purchase—no agents—no red tape. Keep the book or send it back as you wish. It's one book every aviation man should have. Don't miss this chance to see it free.

McGRAW-HILL
FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York.
Send me Chatfield and Taylor's The Airplane and Its Engine, $2.50, for 10 days' free examination. I agree to return the book, postpaid, in ten days or to remit for it then.

Signed .....
Address .....
City ..... State .....
Official Position .....
Name of Company .....
(Books sent on approval in Continental U. S. and Canada only.) Av. 11-9-29



Lee THE REGULATION U. S. ARMY AIR CORPS FLYING SUIT

Veteran of Famous Flights and Thousands of Flying Hours

Yet as new as the latest aviation improvement and development. Aviation constantly looks to Lee for modern, economical flying suits combining comfort and convenience. Four different styles; Four different colors.

Choose Your Color and Style

Fade-Proof French Grey or Marine with Pencil-Stripes of Green; Forest-Green; or All-White Process Twills. Three WHIZITS buttonless styles and one with buttons only.

Made and guaranteed by the makers of the famous Lee Union-Alls. Use this coupon for requesting colored bulletin on Lee Flying Suits.

Lee WHIZIT
UNION MADE
Flying Suits ~ Union-Alls

Mail THIS COUPON *Today!*

H. D. Lee Mercantile Company
Kansas City, Mo., Trenton, N. J.
South Bend, Ind., Salina, Kans.
Minneapolis, Minn.
San Francisco, Calif

Please mail me prices and full details on the Lee Whizit Flying Suit.

Name _____

Address _____

Winged Visitors are no different

from— Visitors on Wheels

IN THOUSANDS of service stations and garages, U. S. Equipment is making possible fast, efficient, dependable super-service that turns passing motorists into regular customers.

Winged visitors are no different from visitors on wheels. Your airport hangar equipped with modern U. S. shop and service equipment will be better fitted to render the type of service that makes visiting pilots come back.

The United States Air Compressor Company is ready to furnish practical suggestions and recommendations for some of the most essential equipment for servicing aircraft.

Write for New U. S. Bulletin

U. S. Bulletin No. 24 describes the newest airport hangar equipment, including U. S. Air Compressors, Engine Cleaners, Paint Spray Units, Electro High Pressure Grease Guns, Portable Compressors, Blow Cleaning Guns, etc. Your letterhead or coupon below will bring complete information at once

U.S. AIR COMPRESSOR COMPANY
5348 Harvard Ave., Cleveland, Ohio

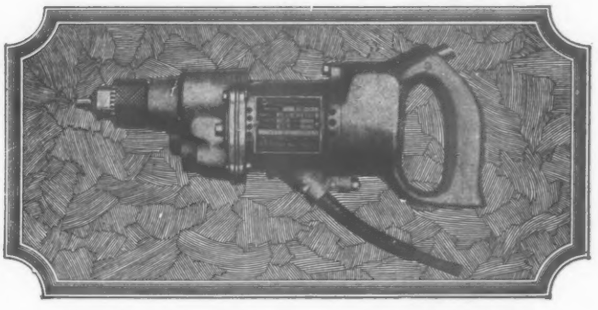
Please send me latest bulletin about U. S. Equipment for airports.

Name .....

Airport .....

City .....

Thor Electric Drills



Designed and built to give matchless performance

Thor Electric Drills are built like skyscrapers, according to definite plans and strict specifications. Every detail of construction is supervised by experienced men. Each part that goes into a Thor is carefully checked. Every tool is subjected to a series of severe tests before it leaves our factory and a record of its performance is kept.

We have found that it pays us to manufacture electric drills by these pre-tested methods. The growth of our business is evidence of that. If you want to experience real drilling satisfaction—try a Thor. Its performance will tell a mighty convincing story about Thor supremacy.

Our No. 17 Catalog should be in your files. It illustrates and describes the complete line of Thor Screw Driving Attachments, Bits and Sockets. A copy is yours for the asking.

TOOL MAKERS SINCE 1893

INDEPENDENT PNEUMATIC TOOL CO.
PNEUMATIC TOOLS — 232 So. Jefferson St. Chicago, Ill. — ELECTRIC TOOLS

Specifically Designed for *BETTER* Aircraft Performance

THE Champion Aero A Spark Plug differs from all other spark plugs in basic design, because Champion makes no compromise with any other spark plugs when performance, safety, and dependability are paramount.

Champion engineers, after years of exhaustive research and experiment, made a radical change in design, and produced a plug specifically designed for better aircraft engine performance.

Retaining all the manifold superiorities of all Champion Spark Plugs, the Aero A is so designed that *it cannot be broken in such a way as to interfere with engine operation.* This plug is the first to use a dual insulator. The principle of dual insulation employs a secondary dome insulator of sillimanite for the protection of the primary. Added to this, the Champion Aero A is of two-piece, gas-tight construction, with special analysis electrodes, thus insuring a fixed spark gap and compression-tight cylinders.

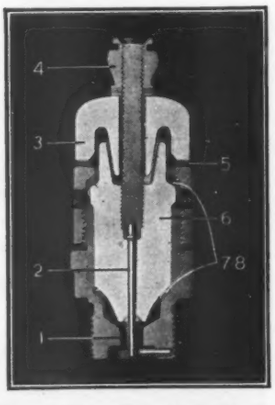
The carefully proportioned restricted bore affords an extra projection of center electrode which withstands a maximum amount of heat and oil without pre-ignition or fouling. The Aero A may be used in all radial air cooled and modern high compression water cooled engines.

Immediate, nation-wide recognition by transport, taxi and private operators is a tribute to the sound judgment of the Champion engineers. Champion invites you to install a new set of Aero A Plugs, and to join the thousands who already enjoy maximum safety and dependability with the spark plug which *cannot fail.*

* * *

Champion Aero A Exclusive Features

1. Restricted bore. 2. Special analysis electrode. 3. Secondary sillimanite dome insulator. 4. Welded steel terminal. 5. Copper seal. 6. Primary sillimanite insulator. 7-8. Molded copper gasket seals.



* * *

Concentration on this one type spark plug (Aero A) for all aircraft engines enables Champion, by virtue of large production, to offer this vastly superior spark plug at the extremely low price of $1.25.

CHAMPION
SPARK PLUGS for AVIATION

TOLEDO, OHIO WINDSOR, ONTARIO

OVER HALF OF TOTAL SPACE ALREADY RESERVED!

ALL-AMERICAN AIRCRAFT SHOW

Detroit City Airport and Hangar

APRIL 5—13, 1930

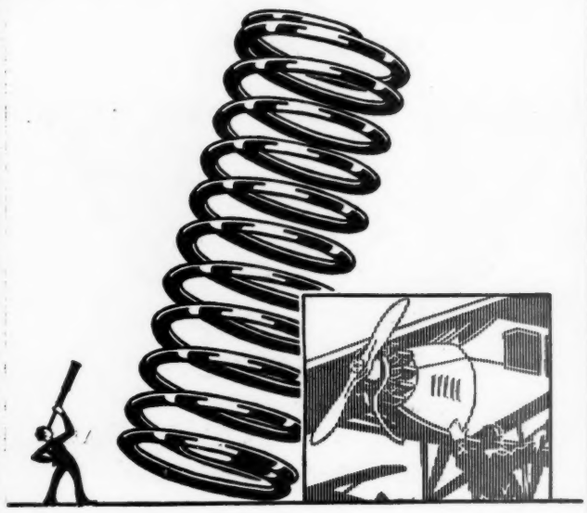
Fifteen manufacturers, exhibiting 49 different planes, have already made application for the Third Annual All-American Aircraft Show at Detroit. To date, over half the 200,000 square feet in the Exhibition Building has been reserved.

The 1930 All-American Aircraft Show offers unusual opportunities. Located at an airport in the heart of Detroit, ships can land and be rolled into position — demonstrations can be given without leaving the flying field. After all, the Detroit Show is the selling show. Make your space reservation now!

OFFICIAL SANCTION

The All-American Aircraft Show to be held under the auspices of the Aircraft Bureau of the Detroit Board of Commerce has been sanctioned by the Aeronautical Chamber of Commerce of America, Inc.

For full particulars apply to
RAY COOPER, Manager
Aircraft Bureau, Detroit Board of Commerce.



DEPENDABLE

---as to test

---in meeting difficult or fussy requirements

---in being up to specifications

---in service

---in meeting ever-changing delivery schedules

---as to speed for experimental work

May we figure on *your* requirements?

THE WALLACE BARNES CO.
BRISTOL, CONNECTICUT

Barnes **made**
COLD ROLLED SPRING STEEL
SPRING WASHERS ASSEMBLIES
SCREW MACHINE PARTS
SMALL STAMPINGS
SPRINGS

To a pilot . . . *curious* sightseers are *worse* than hornets

TO a pilot busy checking and tuning-up his plane curious sightseers on the field are more annoying than hornets. They get in the way . . get into danger . . ask fool questions . . toss matches and cigarettes around as though they never heard of gasoline.

Controlled, sightseers are a source of profit to pilot and airport. Uncontrolled, they become trouble-makers, and often cause accidents that result in costly damage suits.

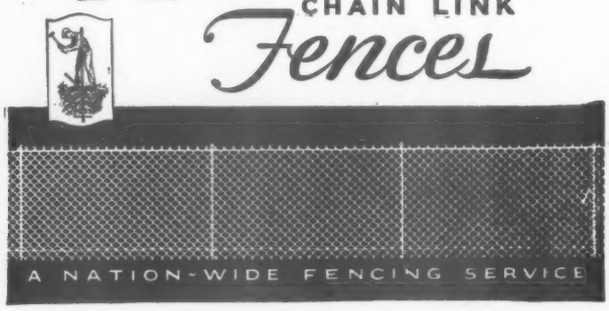
We have cooperated with many airport operators in properly locating and erecting Anchor Fence so as to restrict sightseers to certain safe areas of the airport. One of 75 Anchor offices is near you. Have the Anchor Fencing Specialist at that office submit a plan to cover your particular need.

ANCHOR POST FENCE COMPANY
Eastern Ave. & Kane St., Baltimore, Md.

Albany; Boston; Charlotte; Chicago; Cincinnati; Cleveland; Detroit; Hartford; Houston; Los Angeles; Mineola, L. I.; Newark; New York; Philadelphia; Pittsburgh; St. Louis; San Francisco; Shreveport.

Representatives in other cities. Consult telephone directory.

ANCHOR
CHAIN LINK
Fences



S.S.White Flexible Shafts *for* Tachometer Driving *and other* Power Transmission

Made by the largest producer of steel wire flexible shaft

The S.S.White Dental Mfg.Co.
Industrial Division
152 West 42nd St. New York, N.Y.

Write for this book
Sent free on request

STEEL HANGARS

• PERMANENT •
• FIRE-PROOF •
• LOW COST •

The broad and practical experience of this organization gained over a period of years in the construction and erection of steel buildings has been applied with equal success to the building of airplane hangars. Our knowledge and experience in building steel hangars is at your disposal.

The Thomas & Armstrong Company
Airplane Hangar Division
Dept. G-2
LONDON, OHIO

TITANINE

Registered Trade Mark

A Complete Range of
AIRPLANE FINISHING MATERIALS

Dope-proof paint, black, white, aluminum or grey;
Clear nitrate and acetate dopes;
Ti-Two colored one-material dope;
Pigmented nitrate dopes;
Flexible wing lacquer;
Wood and metal lacquer (for inside and outside finish)

TITANINE, Inc.
Union, Union County, New Jersey
Contractors to the United States Government

U SPECIAL AVIATION PISTON S RINGS

Used by:

Aeromarine	Curtiss
Alliance	Fairchild
Allison	Pratt & Whitney
American Cirrus	Warner
E. W. Bliss	Wright
Comet	and many others

See full page advertisement in current issues of Aero Digest, Western Flying and Aviation Engineering.

U. S. Hammered Piston Ring Co., Paterson, N. J.

W. W. Moss, President, with aviation, manufacturing and financial background, lends experienced leadership to the fine group of B/J engineers. **G. Roger Coats**, Salesmanager, with broad automotive and other merchandising experience, is in a key position to effectively plan and promote sales development for B/J distributors and dealers. *Expect great things of B/J planes.*

W. W. Moss

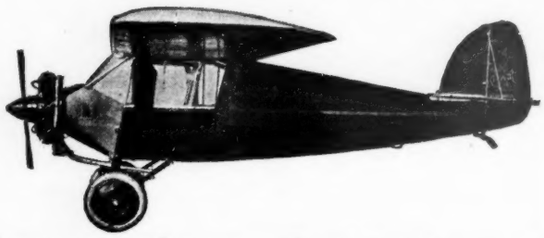
G. Roger Coats

BERLINER-JOYCE
AIRCRAFT CORPORATION
BALTIMORE MARYLAND

SAFETY AIRCRAFT
TIMM
1911

TIMM AIRPLANE CORP.
901 N. San Fernando Rd.
Glendale, Calif.

☆ ONLY
CAVALIER
OFFERS SUCH UNUSUAL
PERFORMANCE
WITH COMFORT AND ECONOMY



Greatest speed range... finest appointments and construction... and now available for delivery... See the nearest dealer or write for complete information.

Star Aircraft Co.
BARTLESVILLE, OKLAHOMA

Aluminum Fuel and Oil Tanks

"Tank up with the leaders"

Lightest aluminum welded tank per gallon —most durable— highest safety factor. Prices in range with commercial aviation.

Streloff-Naughton
CORPORATION
50 Williams Street, Long Isand City, N. Y.
Telephone: Hunters Point 10463

PITCAIRN AIRCRAFT

For Air Mail use SUPER MAILWING

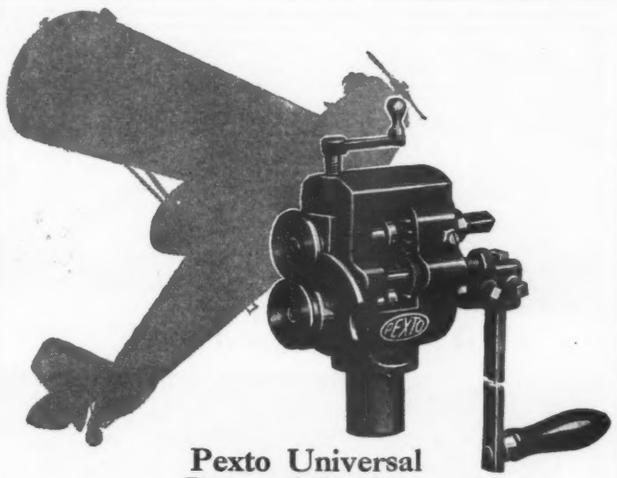
For Sport or Private use SPORT MAILWING

PITCAIRN AIRCRAFT, Inc.
Bryn Athyn Penna.

SEAMLESS
STEEL TUBING
All Aircraft Grades
WAREHOUSE STOCKS for immediate shipment in any quantity.
MILL SHIPMENTS for substantial production requirements.
SERVICE STEEL COMPANY
19 Scott St. BUFFALO
1435 Franklin St. DETROIT
32 E. Front St. CINCINNATI
216 N. Alameda St. LOS ANGELES

"Opportunity" Advertising:
Think *"SEARCHLIGHT"* First!

UNIVERSAL
ALL AERONAUTICAL SUPPLIES
AVIATION CORPORATION
ROBERTSON DIVISION
LAMBERT-ST. LOUIS AIRPORT, ANGLUM, MISSOURI



Pexto Universal Rotary Machines

Pexto Universal Rotary Machines for wiring, turning and burring operations are inexpensive and largely employed by the All Metal Aircraft Builder.

Write for catalogue 25A. Machines and Tools for Sheet Metal Work.

PEXTO

The Peck, Stow & Wilcox Co.
Southington, Conn. U. S. A.

For winter flying—naturally

"THE BEST MOTOR OIL IN THE WORLD"

Aviators have discovered for themselves the supreme quality of Pennzoil. Its performance in record-breaking endurance flights, non-stop flights and in similar achievements has proved beyond a doubt that it is "The best motor oil in the world."

THE PENNZOIL COMPANY, Oil City, Pa.

PENNZOIL

HIGHEST QUALITY PENNSYLVANIA OIL

Heat Treated Forgings

Greatest strength with least weight

We are pioneers in the production of highest grade aircraft and automotive forgings, and we now have one of the most up-to-date heat-treating plants in the country.

Consult us on your requirements. We will gladly place our experience and resources at your disposal.

The Endicott Forging & Mfg. Co., Inc.
90 North Street, Endicott, N. Y.

ENDICOTT

"The forging people who satisfy"

FAIRCHILD cabin monoplanes and open biplanes form a complete line of quality aircraft for dealers' sales. Fairchild aviation products also include pontoons, skis, landing lights and engines. Dealers address Fairchild Airplane Manufacturing Corporation, Farmingdale, L. I., U. S. A.

AIRPLANES

PROPELLERS
HARTZELL
PROPELLER FANS
PIQUA, OHIO, U.S.A.

20 Years Experience Behind Our Service

HARTZELL PROPELLER CO. PIQUA, O.

WINTER FLYING SUITS

NB COMMERCIAL No. 1—Finely woven buckskin cloth, lined with heavy fur. Zipper fasteners. All sizes.....$75.00

NB COMMERCIAL No. 2—Same as above, except lined with long wool sheepskin.

No. 1 grade $60.00
No. 2 grade $50.00

Nicholas-Beazley Airplane Company Inc.
Marshall -- Missouri

WESTERN BRANCH—3769 Moneta Ave., Los Angeles, Calif.

Model C Heat Indicator.

Model 3015-A Heat Indicator. New Army-Navy Size.

BOYCE MOTOMETER

MotoMeter Gauge & Equipment Corporation offer a complete line of airplane heat indicators, oil pressure and air pressure gauges.

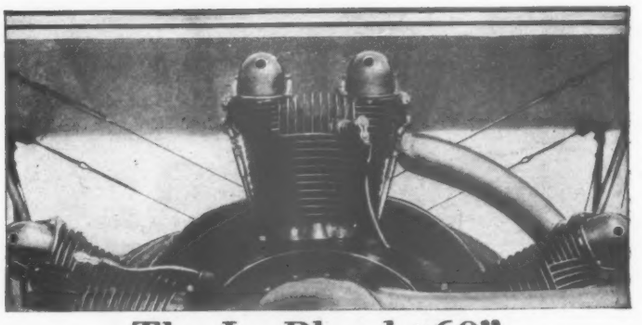
Long experience in the manufacture of these instruments, coupled with large production, makes it possible to offer high grade instruments at reasonable prices. Every means has been taken to insure the dependability of these instruments.

Heat Indicators
Pressure Gauges

Fuel Pressure Gauge No. 2894A. New Army-Navy Size.

Oil Pressure Gauge No. 2893A. New Army-Navy Size.

MotoMeter Gauge and Equipment Corporation
2 Wilbur Avenue, Long Island City, N. Y.

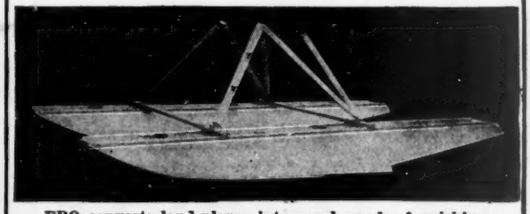


The Le Blond "60"

U. S. Dept. of Commerce
Certificate No. 12
Approved by the U. S. Navy
65 H. P. at.....1950 R. P. M.
Bore 4.125 in.....Stroke 3.750 in.
Piston displacement 250.58 cu. in.
Compression volume ratio...5.42:1
Dry weight complete.....222 lbs.
The LE BLOND AIRCRAFT ENGINE CORPORATION, Cincinnati, U. S. A.

EDO

THE FLOAT MAKERS



EDO converts land planes into seaplanes by furnishing complete float installation, which is interchangeable with the wheel landing gear. Its installations are approved by the Department of Commerce. Complete seaplanes incorporating EDO equipment can also be purchased direct from the leading airplane manufacturers. May we send particulars?

EDO AIRCRAFT CORP., 600 Second St., College Point, L. I.

COLONIAL GRAIN UPHOLSTERY LEATHER

made by

EAGLE-OTTAWA LEATHER COMPANY
Grand Haven, Mich.

Genuine leather for airplanes is NON-INFLAMMABLE durable and clean.

Sample books furnished on application

Chicago, Ill.
912 W. Washington Blvd.

St. Louis, Mo.
1600 Locust St.

Toronto, Ont.
152 Duchess St.

New York City
74 Gold St.

San Francisco, Calif.
569 Howard St.

Portland, Ore.
474 Glison St.

Cunningham-Hall Airplanes

All-metal structure — insures durability, lower maintenance and greater safety.

Manufactured by

CUNNINGHAM-HALL AIRCRAFT CORPORATION
13 Canal St.
ROCHESTER, NEW YORK

The Budd Wheel Company

Makers of Wheels for airplanes

PHILADELPHIA AND DETROIT

JAEGER

8 Day Watch

Chronograph 8 Day

Time of Flight Watch, 8 Day

TODAY no plane is complete without a Jaeger timepiece. The last word in precision watches. 8 day model—or stop watch Chronograph—or an 8 day instrument with "time of flight" indicator. These models mount flush on the panel and have front wind and set. Radium treated dials if desired.

JAEGER WATCH COMPANY
E. L. VAIL, Vice-Pres.
304 EAST 45TH ST., NEW YORK CITY
London — Geneva — Paris
8 DAY WATCHES FOR AUTOMOBILES

Another exclusive feature—Jaeger service stations are located all over the world.

AERONAUTICAL TIMEPIECES

Look Ahead with Austin!

TRANSPORTATION terminals of the future will take air commerce into account just as naturally as they recognize railroads, buses, and subways today.

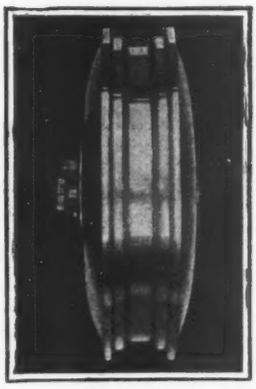
Austin Engineers are looking ahead, designing and building airports, hangars and other aviation structures with a view to tomorrow's needs. In this day of rapid obsolescence, it will pay you to consult an organization that is helping its clients to anticipate the future and to keep ahead of the times.

For preliminary surveys, reports, designs, approximate costs of airports and buildings, phone the nearest Austin office, or mail the Memo below.

THE AUSTIN COMPANY Cleveland
Engineers and Builders to the Aviation Industry
New York Chicago Philadelphia Detroit Cincinnati Pittsburgh St. Louis Seattle Portland The Austin Company of California: Los Angeles and San Francisco
The Austin Company of Texas: Dallas

An Air-Rail-Water Highway Terminal of Austin Design

AUSTIN



STRENGTH

THE actual structural strength of these wheels is far in excess of the requirements of the official hand books or of the ability of the tires used to stand, thus increasing the FACTOR OF SAFETY at a vital point. This with decreased weight.

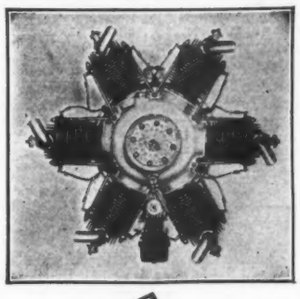
Bendix Wheels and Brakes are now in production in standard sizes.

(Fully protected by patents and applications in U. S. and abroad)

BENDIX BRAKE COMPANY
Division of Bendix Aviation Corporation, Chicago

BENDIX 4 BRAKES

FOR SAFETY



OK

OK

The Department of Commerce has approved the new Brownback C-400 . . .

Featured by simplicity of construction, economy of operation and low r. p. m. this new aircraft engine is ideal for commercial flying.

OK

BROWNBACK

AIRCRAFT ENGINES

Graybar Building, New York

WHERE TO FLY

ALABAMA

MONTGOMERY SCHOOL OF AERONAUTICS
MONTGOMERY AIRPORT
(600 Acres)
Montgomery, Ala.

Save money and learn to fly with us where climatic conditions permit daily instruction, thus permitting you to complete the course in one half the time required in other sections of the country.
Send for our literature.

CALIFORNIA

AIRTECH SCHOOL OF AVIATION
LINDBERGH FIELD, SAN DIEGO, CALIFORNIA
Send For Complete Information
Department of Commerce Approved Transport Ground & Flying School

CONNECTICUT

L & H
FLYING SCHOOL
Hartford Airport—
at Hartford, Conn.
PART OF THE
COLONIAL
FLYING SYSTEM

FLORIDA

The Insignia of Specialists

Choose your school as you would your doctor.

Courses offered that qualify you for Dept. of Commerce License. Write for details.

McMULLEN AVIATION COLLEGE
Tampa, Fla., P.O. Box 4191
Where *every* day is a FLYING day

NEPCO—School of Flying

Announces the opening of their Winter Flying School at Piper Fuller Airport, St. Petersburg, Florida, December 1st.
Entire flying equipment and personnel will be moved from its own mile square airport, Wisconsin Rapids, Wis., to the Sunshine City. Planes used for instruction include Fairchild-KR. Biplanes, Curtiss Robin Monoplanes, Fairchild 5-passenger Monoplanes and 12 passenger Ford Tri-Motor Monoplanes. Room and Board at airport. Enrollments being received now and limited to 50 students.
25 Hr. Private Pilot's Course, $475. 50 Hr. Limited Commercial Pilot's Course, $850. 200 Hr. Transport Pilot's Course, $3,500. Terms can be arranged. All planes and Pilots Licensed by U. S. Government. For full information write, wire or call.
NEPCO TRI-CITY Flying Service, Inc.
Capt. L. G. Mulzer, Gen. Mgr.
Wisconsin Rapids, Wis.

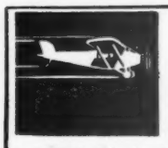
ILLINOIS

FOR SUCCESS IN THE AIR TAKE OFF WITH

CONTINENTAL

Investigate our Pilots Training School—Unit Method—pay as you go. Air Corps System — no long ground course—our own field to fly from.

CONTINENTAL AIR SERVICES
Incorporated
2420 South Parkway, Chicago



LEARN TO FLY AT

SKY HARBOR

Learn at Sky Harbor the finest flying field in the Middle West—we operate the Gray Goose Air Lines. Complete course in ground work and flying. Write for catalog.
SKY HARBOR FLYING SCHOOL
1801 South Michigan Ave., Chicago, Ill.

Learn to Fly at a Midwest Airways Corporation School
Under the direction of John H. Livingston
Three large Airports in the central west—at Aurora, Ill., Monmouth, Ill., and Waterloo, Iowa. We are training students to fly because we need pilots for the planes we sell. Largest distributors of commercial aircraft in the central states.
MIDWEST AIRWAYS CORPORATION
Waco and Ryan Distributors

Eagle Airways, Hinckley, Illinois, formerly Eagle Airport School of Aviation, 60 miles West of Chicago. Learn to fly at our new location on the Transcontinental Airway, DeKalb County Airport, equipped for night flying. Transport Pilots, modern equipment, reasonable rates, excellent accomodations. Distributors for Stinson Monoplanes, Air-Kings and Monocoupes. Write for free information.
EAGLE AIRWAYS, INC.
Hinckley, Illinois

KANSAS

LEARN TO FLY IN WICHITA

The logical place to learn aviation is where the industry is centered—Wichita, the Air Capital, where 25% of the commercial planes flying in America today were made, where opportunities are waiting while you prepare. May we tell you about it? Write today.
THE BRALEY SCHOOL OF FLYING
Department 8, Wichita, Kansas.

MARYLAND

LEARN TO FLY NOW
$15 and $20 per Hour
on our ships. Free instruction on your own. We have unusual bargains in used planes of the Curtiss Line—All Types. Personnel and equipment licensed. Fly all year. Pay as you learn. Safe, flat, open country. *Write for Particulars.*
Tred Avon Flying Service, Inc.
Easton, Maryland

MICHIGAN

Complete Air and Ground School
TRAVEL AIR AND STINSON PLANES
EXPERIENCED INSTRUCTORS
FURNITURE CAPITAL AIR SCHOOL
701 Michigan Trust, Grand Rapids, Mich.

MICHIGAN

ALL NEW, HIGH PERFORMANCE EQUIPMENT. COMPLETE GROUND AND FLIGHT TRAINING FOR GOVERNMENT PILOT LICENSES.

Write
NATIONAL AIRWAYS, INC.
533 Book Bldg., Detroit

LEARN TO FLY IN DETROIT
"Every Student a Booster"
We Train in Both — Cabin and Open Planes
Write HARRY ANDERSON
2125 David Stott Bldg., Detroit, Mich.

MISSOURI

Complete flying and ground courses under licensed transport pilots. New Travel Airs with OX5, Whirlwind, and Caminez motors. Send for free copy of "Skyward Ho!" our profusely illustrated catalog.
PARKS AIR COLLEGE
204 Mo. Thea. Bldg.
St. Louis, Mo.

N-693

A National System of Aviation Schools

Universal Flying School	Cleveland, Ohio
Universal Flying School	Marion, Ill.
Universal Flying School	Memphis, Tenn.
Universal Flying School	Minneapolis, Minn.
Universal Flying School	Oklahoma City, Okla.
Universal Flying School	Rochester, Minn.
Universal Flying School	St. Louis, Mo.
Universal Flying School	St. Paul, Minn.
Universal Flying School	Wichita, Kansas
Porterfield Flying School	Kansas City, Kansas

UNIVERSAL AVIATION SCHOOL
Headquarters
1061-1070 Boatmen's Bank Bldg., St. Louis, Mo.

NEBRASKA

LearnAVIATION
WHERE LINDBERGH STARTED!
GET TRAINING THAT ASSURES SUCCESS!
Come to Lincoln—one of the largest, best-known and finest-equipped civilian air schools in the U. S. We trained Lindbergh (our FREE Literature tells the story). Prepare you for a pilot, commercial or transport license. Complete, practical courses in airplane building and mechanics. Instructors and training planes carry U. S. Dept. of Commerce licenses. Write for FREE Literature today.
LINCOLN AIRPLANE SCHOOL
740 Aircraft Bldg., Lincoln, Nebr.

WHERE TO FLY

NEW JERSEY

IF YOU WANT TO LEARN TO FLY

It will pay you to visit Newark Air School—one of the finest air schools in the East—before making your choice. Capt. J. O. Donaldson and Maj. R. L. Copsey in charge. Twelve new planes. Elementary and advanced courses. Write for catalog.

NEWARK AIR SERVICE INC.

NEWARK METROPOLITAN AIRPORT
Newark, N. J. Tel. Mulberry 1310
30 minutes from New York City

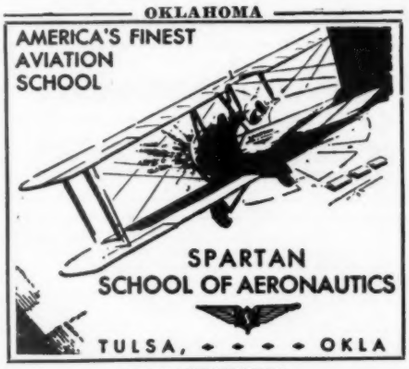
NEW YORK STATE

THE PERFECT TAKE-OFF FOR YOUR FLYING CAREER...

ROOSEVELT AVIATION SCHOOL

After the Army pattern—equipment, curriculum, Army-trained instructors. At Roosevelt Field, where Lindbergh, Chamberlin and Byrd hopped from. 45 minutes from Broadway. Dormitory, for resident students, and swimming pool now in progress. *Write* N. J. Boots, Lt. Col., Roosevelt Aviation School, Inc., Mineola, L.I., N.Y.

OKLAHOMA



AMERICA'S FINEST AVIATION SCHOOL

SPARTAN SCHOOL OF AERONAUTICS

TULSA, OKLA

AIRVIEW FLYING SERVICE, Inc.

Red Bank, New Jersey
Waco and Fairchild Aerial Taxi Service to Any Point. Flying School Operated from the Finest Field on the Jersey Coast
Hangar Space at Reasonable Rates

FLYING SCHOOLS — TRANSPORT — AIR MAIL — SALES & SERVICE

COLONIAL FLYING SCHOOL

Utica Airport—at Utica, N. Y.

PART OF THE **COLONIAL** FLYING SYSTEM

PENNSYLVANIA

STULTZ FIELD
TIPTON, PA.

Four Way Field

80 Acres

Complete primary and advanced ground and flying courses.
All equipment and personnel licensed by both State and Federal Departments of Commerce. Write for booklet.

Altoona Aircraft Corp.
P. O., Tyrone, Pa.
Central, Pa. distributors for Curtiss Flying Service, Kreider-Reisner Aircraft Corp.

NEW YORK STATE

FLYING SCHOOLS — TRANSPORT — AIR MAIL — SALES & SERVICE

COLONIAL FLYING SCHOOL

Buffalo Airport—at Buffalo, N. Y.

PART OF THE **COLONIAL** FLYING SYSTEM

FLYING SCHOOLS — TRANSPORT — AIR MAIL — SALES & SERVICE

ROCHESTER FLYING SCHOOL

Rochester Airport—at Rochester, N. Y.

PART OF THE **COLONIAL** FLYING SYSTEM

THE "WHERE TO FLY" SECTION IS ARRANGED GEOGRAPHICALLY FOR YOUR CONVENIENCE. LEADING SCHOOLS THROUGHOUT THE COUNTRY ARE REPRESENTED IN THIS SECTION. SELECT YOUR SCHOOL FROM THIS CONVENIENT GUIDE.

NEW YORK CITY

CURTISS-WRIGHT FLYING SCHOOLS

For a thorough aviation education select one of Curtiss-Wright's 40 standard schools. Write for booklet. Dept. P, 27 West 57th St., New York City.

Curtiss-Wright Flying Service
"World's Oldest Flying Organization"

BEST TRAINING AT LOWEST PRICES

New Late type equipment, experienced transport pilots. Field with hard surfaced runways. Ten years' successful experience in commercial aviation.

SOUTHERN AIRWAYS SCHOOLS
McAllister Bldg., San Antonio, Tex.

PITCAIRN AVIATION of Pennsylvania, Inc.

10-, 20- and 50-Hour Flying Courses leading to Federal licenses conducted at Pitcairn Field, Willow Grove, Pa., one of the largest in the East, in midst of ideal flying country. All-year-round school. Modern flying equipment. No liability bond required. Write for Illustrated Booklet.

Pitcairn Field, Willow Grove, Pa.

PROFESSIONAL SERVICES

AERO-KEN

Aeronautical Engineering
Complete Design
and Stress Analysis

500-504 Investment Bldg.
Washington, D. C.

Edward A. Stalker, 302 Eng. Bldg.

AIRPLANE DESIGN
Stress Analysis
Performance Tests
Aerodynamic Investigations

Ann Arbor, Michigan

The Laboratories and the New Windtunnel of the Tubular Air-Craft Corp.

are now open for manufacturers and private individuals desiring to determine the worthiness of their patents or inventions dealing with new type of Airplanes, Helicopters, Ornithopters, etc.
Actual flying models, windtunnel and demonstration models made. Low rate.
For further information write

Tubular Air-Craft Corp.
Laboratory
1125 Farm Road, Secaucus, New Jersey

If You Need Expert Advice on Engineering Problems
Write or Wire

AIRCRAFT ENGINEERS INC.

Consultants for the Aircraft Industry
2012 So. Wabash Ave., Chicago, Ill.
Complete Stress Analysis
Development of New Designs

SHOWALTER-ASSOCIATES

Airport Planners Architects Engineers
2210 Park Ave.
DETROIT
Suite 247 Write or Wire

AIRCRAFT SERVICE DIRECTORY

See our Advertisement
on inside back cover of Oct. 19th issue
PIONEER INSTRUMENT COMPANY
254 LEXINGTON AVE. BROOKLYN NEW YORK

Burgess Norton Perfectlap Piston Pins for the following makes of motors are stocked by Automotive Jobbers everywhere.

Curtiss OX-5
Curtiss OXX-6 — U.S.A.Std.
Wright, Whirlwind } J4, J5 — Liberty

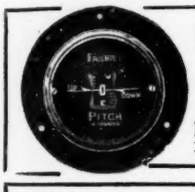
THE BURGESS NORTON MFG. CO.,
549 Peyton St., Geneva, Ill.

TRIUMPH
MAGNETIC
FUEL GAGES FOR AIRCRAFT
NEW MODELS FOR COWL, WING, OR SPECIAL TANKS
Manufactured by
The Boston Auto Gage Company
PITTSFIELD, MASSACHUSETTS

PITCH & BANK INDICATOR
Your Position at a glance
Booklet "RIEKER Navigating Instruments" sent on request.
RIEKER INSTRUMENT COMPANY
1919 Fairmount Ave., Philadelphia, Pa.

STEARMAN and AEROMARINE KLEMM
GEO. A. WIES, INC.
Hangar and Office, Roosevelt Field — Garden City, New York

Motorize Your Hangar Doors
Allen & Drew, Inc.
Cambridge, Mass.
See our full page Adv. in Oct. 19th



PITCH INDICATOR
Adjustable Zero
Readable at a Glance.
Booklet on Request
Frisbie Aircraft Products
Box 389, New Haven, Conn

Paragon Propellers
Paragon Engineers, Inc., 242 Grindal St., Baltimore, Md.

Phoenix Clear Nitrate Dope
$1.35 in 50 gal. wood barrels.
$1.37 in 30 gal. wood barrels.
$1.55 in 5 gal. boxed cans.
Immediate shipments F. O. B. factory. All fresh made from new and high grade materials.
PHOENIX AIRCRAFT PRODUCTS CO.
Williamsville, N. Y.

Airplane Covers
Silk thread sewed with "FLIGHTEX" AAA Fabric. Our prices below that of cheap cotton

Standard J1	$105	American Eagle	$100
Jenny	95	Commandaire	100
Canuck	100	Challanger	100
Waco 9	95	Swallow	95
Waco 10	95	Travel Air	100
Eaglerock	100	Monocoupe	75

Pinked Tape 3c. yd. Long Needle, 25c.
Dope $1.50 gal. Thinner, Ditto.
Ribcord $3 lb.
EVERYTHING FOR AIRCRAFT
OSTERGAARD
AIRCRAFT WORKS
4305 N. Narragansett Ave., Chicago, Ill.

STAKLAK REG. U.S. PAT. OFF. WONT BURN OFF
Developed especially for use on airplane exhaust rings, manifolds and stacks.
Adds greatly to the appearance of any ship. Protects the surface from scale and rust.
Can be furnished in three colors, Red, Blue or Green half-pint cans 50c or Aluminum half-pint cans 75c.
Manufactured exclusively for and sold by
JOHN S. COX & SON
Aeronautical Supplies
Terre Haute, Ind.

GARDNER PROPELLERS
In Stock or on Short Notice
12 Years' Experience
GARDNER PROPELLER WORKS
Forest Park, Ill.

AVIATION PROTECTION, INC.
INSURANCE BROKERS TO AVIATION
110 WILLIAM STREET
NEW YORK

H A S K E L I T E
PLYWOOD
Used by every important builder. Recognized as the standard plywood for airplane construction. Over 30 applications. Blue print data book on request.
HASKELITE MFG. CORPORATION
120 S. LaSalle Street, Chicago, Illinois

DANIEL GUGGENHEIM SCHOOL OF AERONAUTICS
Graduate and Undergraduate Courses in Aeronautical Engineering and Air Transport. Particulars from Dean, College of Engineering.
NEW YORK UNIVERSITY
University Heights, New York, N. Y.

Northeaster
FLYING TOGS
HELMETS · GOGGLES
FLYING SUITS
WRITE FOR COMPLETE CATALOG
DEUCE DISTRIBUTING CORP. 111 E. 13th St. N.Y.C.

HANGARS
Fireproof steel hangars.
Erected anywhere.
Send for catalogue No. 110
AIRPORT HANGAR
Chatham Phenix Bldg.
Long Island City, N. Y.
Eastern Representatives of
INTERNATIONAL STEEL and IRON CO.
Evansville, Indiana, U. S. A.

Actual Size
SEND ONE DOLLAR

We will send you by return mail a beautiful pair of sterling silver wings mounted on bar pin with safety catch, also identification card issued by National Flyers Ass'n. These pins are being worn by thousands of aviators, aviation mechanics and boosters.
Illustrated booklet describing Davenport's large Airport and school mailed with each order.
Iowa-Illinois Airways Inc.
Davenport, Iowa

Consult the Professional Service Directory on Page 41

SEARCHLIGHT SECTION

EMPLOYMENT and BUSINESS OPPORTUNITIES—USED and SURPLUS NEW EQUIPMENT

UNDISPLAYED—RATE PER WORD:

Positions Wanted, Positions Vacant, **and all other classifications, excepting equipment, 10 cents a word, minimum $2.50 an insertion; 15 cents a word if a box number address care of any of our offices is used.**

Proposals, **40 cents a line an insertion.**

INFORMATION:

Box Numbers **may be in care of our New York, Chicago or San Francisco offices.**

Discount **of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).**

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$6.00 an inch
4 to 7 inches..... 5.75 an inch
8 to 14 inches..... 5.50 an inch

Other spaces and contract rates on request.

An advertising inch **is measured vertically on one column, 3 columns—30 inches—to a page.**

FOR SALE

AIRPLANE motors: Hispano-Suiza A, 150 hp.; Hispano-Suiza E, 180 hp.; Siemans-Halske and Curtiss OX-5 motors, all in excellent condition. OX-5s at especially attractive prices. Write American Eagle Aircraft Corporation, Purchasing Agent, Fairfax Airport, Kansas City, Kansas.

AVRO Avian, licensed, with Cirrus motor. Privately owned. Flown less than 50 hours. Excellent condition. Newly repainted and overhauled. George A. Weis, Roosevelt Field No. 2, Garden City, N. Y.

BRAND new Arrow Sport LeBlond motor; just as it was received from the factory, in perfect condition, has never been flown; $2,400 for immediate sale. Hugh Rockwell, Freeport, Long Island. Telephone 4853.

FIVE-PLACE Hisso Standard, recently overhauled and reconditioned. Removable seats. Seventy-two cubic foot cargo space available. Best offer takes it. Frank Kornrumpf, 113 W. Garrison, Dearborn, Mich.

FOR SALE: Single-place racer, similar to Heaths Baby Bullet. Specially built for National Air Races, but not finished in time. Experimental license, Anzani 60, all steel construction, expert workmanship. Brand new and never cracked. Motor needs minor adjustments. In test flights speed was 175 m.p.h. Cost $4,000 to build, a sacrifice at $2,000 cash. David B. Read, 220 Algoma Blvd., Oshkosh, Wis.

FOR SALE—Gaumont Aerial Camera—Carl-Zeiss Lens 20" F-5. Focal plane shutter; uses Fairchild film magazine, which holds a 75-foot roll of aero film, permitting 110 exposures being made with one loading. All above in fair condition. Price $250. Fairchild Aerial Surveys, 270 West 38th St., New York City.

FOR SALE—Waco 10 OX-5, licensed; 200 hours, never cracked. Good condition, motor completely overhauled. Bargain at $1,550. Have bought Moth reason for selling. Wellsville Aviation Club, Wellsville, N. Y.

FOR SALE: OX-5, long-wing Eagle Rock, licensed until September 1, 1930. A-1 condition; always kept in hangar, never damaged. Engine is equipped with Scintilla Magneto, Miller Valoe action, and roller rocker arms. Price right to quick buyer. Sunbury Flying Club, Sunbury, Pa.

FOR SALE: Three OX-5 motors in excellent condition, all will turn over 1,400 on ground. $250 each. One Capitol Marine Conversion for OX-5 and OXX-6 complete only, been used twelve hours, cost new, $800. Will sell for $150. Elwyn West, Menasha, Wis. Route 1.

FOUR new Velie engines for sale. Aircraft manufacturer has surplus engines and is offering them for sale. These engines may be purchased at an exceedingly low price. Write or wire for details. FS-311, Aviation, 520 N. Michigan Ave., Chicago, Ill.

FOR SALE—Eaglerock J-5, motormount and cowling all complete; make offer. FS-310, Aviation, 10th Ave. at 36th St., New York.

FOR SALE: OX-5 Comb. Eaglerock, fully licensed and in perfect condition. Ship never cracked. Equipped with navigation and landing lights, dual controls, large wheels, new tires, new propeller, wing walks on both sides. Motor just had complete overhaul. All new cylinders, pistons, bearings, etc. A sacrifice, $1,850. Cleveland Air Service Inc., 3835 W. 162nd St., Cleveland, Ohio.

FOR SALE: Cracked American Eagle, OX-5 motor; also have new OX Hamilton propeller and one complete set of OX cylinders. For information write Guy E. Blodgett, Marshfield, Wis.

FOR SALE: Three-place Standard J-1, 180 Hisso in good flying condition. Motor turns 1,500. Bargain for $825. Can arrange terms for part, or will trade. What have you? Vern Canning, 352 11th St., Milwaukee, Wis.

FOR SALE: Ryan Brougham, 5-passenger, J-5 motor, 110 hours since purchased. Perfect condition. Will consider reasonable offer. Guy E. Blodgett, Marshfield, Wis.

FOR SALE: OX-5 Jenny, just rebuilt, fine condition; many extra parts, $550. Frank F. Heitz, Wright Field, Dayton, Ohio.

FOR SALE: Waco 1929 model, excellent condition, $1,700. Free 50-hour flying course with purchase. Act now. Robbins Flying Service, Akron, Ohio.

FOR SALE: Siemens Halske-motored Waco, 125 hp. Wonderful condition. $2,200 for quick sale. Robbins Flying Service, Akron, Ohio.

FOR SALE: OX-5 Travel-Air biplane, Model 2000, in A-1 condition, $2,000. Aero Marine U. 6. D., 135 hp., American Eagle biplane, like new, $1,850. OX-5 Hartzell propeller for Travel-Air in original crate, $60. E. G. Damron, Marshfield, Wis.

FOR immediate sale at a price considerably below their value—one Laird three place biplane, equipped with Wright J-5 motor. Dual controls. Ship is in splendid condition and all covers in excellent shape. Has always been kept in a hangar and has only had 619 hours. Motor operates perfectly and has had 659 hours. Licensed and ready to fly away. Also, one Fokker Super-Universal cabin monoplane. Six passenger and pilot. Powered with Wasp motor just overhauled. A beautiful appearing and beautiful flying job. Ship has had a total of 315 hours. Motor has had 368 hours. Licensed and ready to fly away. Both these planes are in perfect condition and will be sold together or separate. FS-301, Aviation, 520 N. Michigan Ave., Chicago, Ill.

HEATH super parasol wings, uncovered. Fuselage, tail surfaces covered and doped, controls installed. All wires flying struts landing gear included. Experienced workmenship. Price crated ($235). Fred Wharton, Jacksonville, Ill.

HENDERSON motor with 2 to 1 reduction. Pulls 6 ft. propeller; off in one fourth the space of straight conversion. W. Cropp, 3048 N. Lockwood Ave., Chicago, Ill.

ONE new Cessna A. W. Warner cabin monoplane, has been used thirty hours. Owner must sell on account of not obtaining pilot's license. Price $5,000. Can be seen at Palwaukee Airport, Mount Prospect, Ill. Address L. Bjourndahl, in care of Palwaukee Airport.

OX-5, completely rebuilt in our own shop for our own use, Miller rocker arms, motor has had only 62 hours since brand new, turns 1,450 on test stand and is complete. Make your best offer and do it quick. Hain-Spatz Motor Co., Reading, Pa.

OX-5, rebuilt from stem to stern, complete; turns 1,450 on test stand. The first $340 takes it. Don't delay. Hain-Spatz Motor Co., Reading, Pa.

OX Robin, six months old, Oleo gear, completely equipped. Good as new for $2,950. Teach to fly free. The best buy ever. Wire Chas. Hastings, Goshen, Indiana.

OX Eaglerock, good condition, flys hands off, licensed. Motor turns 1,425 on ground. $1,500. F. W. Reed, 116 E. Morley Ave., Dearborn, Mich.

PARACHUTES, new and used, rope ladders for stunt men, etc. Specify weight. Thompson Bros. Balloon and Parachute Co., Aurora, Illinois. Established 1903.

BARGAIN

Imported DeHaviland Moth

Cost new $5,900. Privately owned. Approximately 50 hours. Ship and motor guaranteed like new.

FS-317, Aviation
Tenth Ave. at 36th St., New York City

FOR SALE

STEARMAN

Wright J-5 Motor, excellent condition. Never crashed. Time flown 350 hrs. Equipped with complete Pioneer instrument board and night flying accessories, spare gas tank. Change of equipment only reason for sale.

Cox & Stevens Aviation Corporation
521 Fifth Avenue, New York City

Exceptional Values

Two Ox-5 Travel Airs

ALSO

LeBlond Arrow Sport

All in perfect condition and guaranteed same as new. No reasonable offers refused.

Wright & Esenwein, Inc.
Municipal Airport
Buffalo, N. Y.

FOR SALE

RUMMELL MONOPLANE

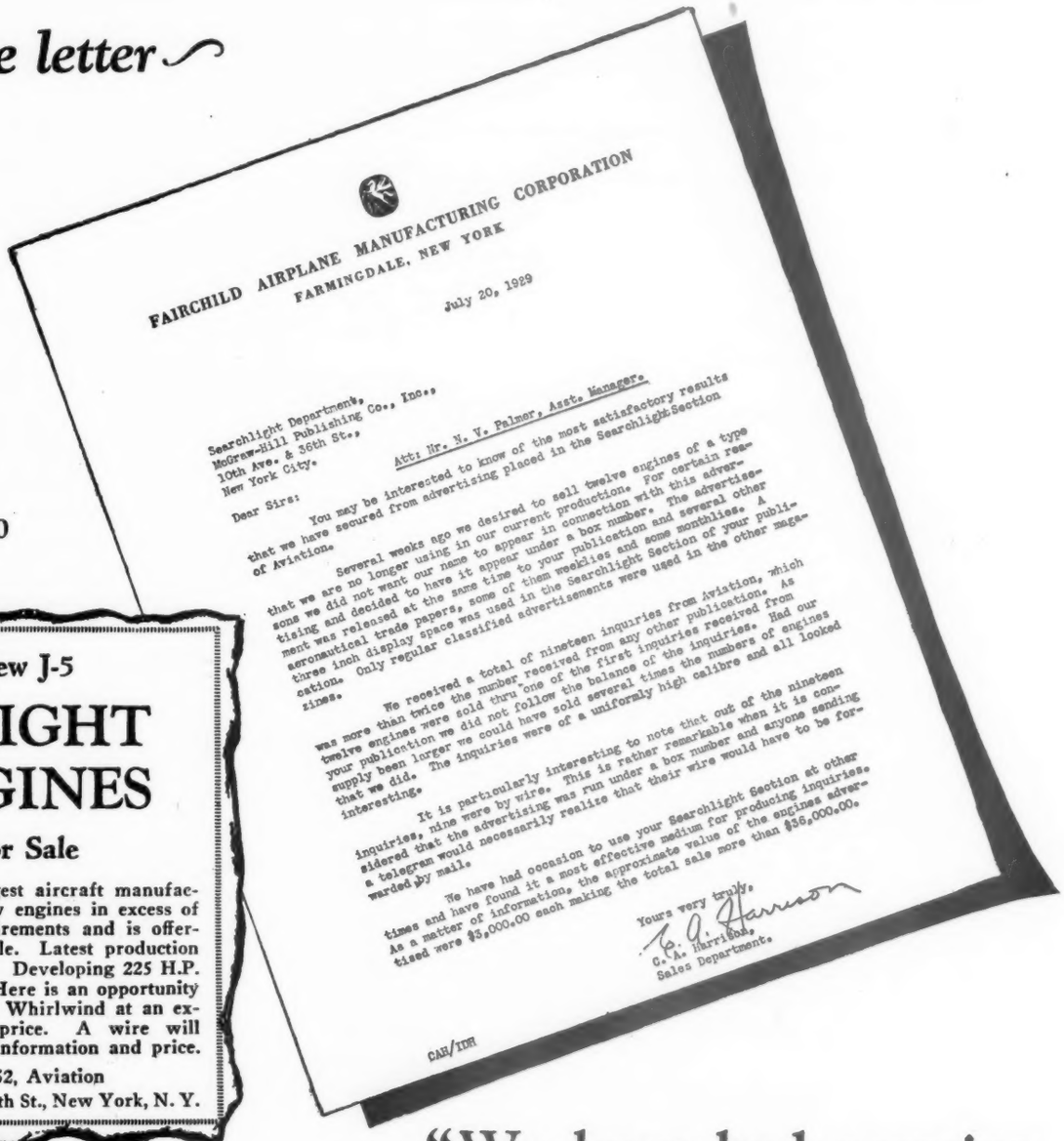
2-place dual control. Just the plane to build up time.

Write for Particulars
HARRY B. RUMMELL CO.
Findlay, Ohio

An $18.00 ad that produced sales of more than $36,000.00

Read the letter

This is the ad that sold 12 engines worth more than $36,000.00



FAIRCHILD AIRPLANE MANUFACTURING CORPORATION
FARMINGDALE, NEW YORK

July 20, 1929

Searchlight Department,
McGraw-Hill Publishing Co., Inc.,
10th Ave. & 36th St.,
New York City.

Dear Sirs: Att: Mr. N. V. Palmer, Asst. Manager.

You may be interested to know of the most satisfactory results that we have secured from advertising placed in the Searchlight Section of Aviation.

Several weeks ago we desired to sell twelve engines of a type that we are no longer using in our current production. For certain reasons we did not want our name to appear in connection with this advertising and decided to have it appear under a box number. The advertisement was released at the same time to your publication and several other aeronautical trade papers, some of them weeklies and some monthlies. A three inch display space was used in the Searchlight Section of your publication. Only regular classified advertisements were used in the other magazines.

We received a total of nineteen inquiries from Aviation, which was more than twice the number received from any other publication. As twelve engines were sold thru one of the first inquiries received from your publication we did not follow the balance of the inquiries. Had our supply been larger we could have sold several times the numbers of engines that we did. The inquiries were of a uniformly high calibre and all looked interesting.

It is particularly interesting to note that out of the nineteen inquiries, nine were by wire. This is rather remarkable when it is considered that the advertising was run under a box number and anyone sending a telegram would necessarily realize that their wire would have to be forwarded by mail.

We have had occasion to use your Searchlight Section at other times and have found it a most effective medium for producing inquiries. As a matter of information, the approximate value of the engines advertised were $5,000.00 each making the total sale more than $36,000.00.

Yours very truly,
C. A. Harrison
Sales Department.

CAH/IDH

New J-5

WRIGHT ENGINES

For Sale

One of the largest aircraft manufacturers has a few engines in excess of production requirements and is offering them for sale. Latest production and never used. Developing 225 H.P. at 1800 r.p.m. Here is an opportunity to secure a new Whirlwind at an exceedingly low price. A wire will bring complete information and price.

F. S.-52, Aviation
Tenth Ave. at 36th St., New York, N. Y.

"We have had occasion to use your Searchlight Section at other times and have found it a most effective medium for producing inquiries"

Turn YOUR used and surplus equipment into CASH. Mail a list of the equipment you have for sale to the Searchlight Department and let us tell you exactly how much it will cost to advertise it. Address: SEARCHLIGHT DEPARTMENT, Tenth Avenue at 36th Street, New York City.

FOR SALE

TRAVELAIR OX-5, Model 2000, one year old, $1,500. Eaglerock OX-5, new, still at factory, $2,500. Eaglerock with Warner motor, one year old, $3,000. Argo demonstrator, like new, big discount. Stinson junior Wright 165 J-6, three months old, $6,500. Mathewson Airways, Inc., 4278 Fort St., West, Detroit, Mich. Tel. Laf. 0195.

TRAVELAIR J-5, $6,200; steel prop., $400; extra instruments, equipped cross country, new this spring, motor 25 hours, cost $9,000. U. S. Aircraft Co., 76 Nielson St., New Brunswick, N. J.

150 hp. Hisso engine and radiator. Good running order, but not recently overhauled. $275. Can demonstrate. Spencer Heath, 242 Grindell Street, Baltimore, Md.

WACO 9, top overhaul, motor and ship; flown one hour, metal spar ends, eligible for license, $1,000. Harold W. Holley, 1325 Carpenter Ave., Des Moines, Iowa.

WACO nine, $950 1927; Swallow nine, $150; both planes now in storage, good condition, will deliver. Marvin A. Northrop Aeroplane Company, 730 Washington Ave., North Minneapolis, Minn.

WE are replacing our present equipment with large planes. Have for sale one new Lincoln Page 3-place, OX-5 motor. One Waco 10, slightly used. Two steel fuselage Hisso jobs. One T P Swallow. Two monoplane wings made ready to cover. Call at our field at Anderson, Ind. Orin Welch Aircraft Co.

EQUIPMENT WANTED

WANTED: Heath-Henderson motor. State price and condition. Leroy Albright, R. 5, Lebanon, Pa.

POSITIONS VACANT

AERONAUTICAL opportunity. The Major Aircraft Corporation will train a few more men for aviation manufacturing mechanics. If you are seriously interested and are not the "Busted Floater" call at our factory, 129 Grand Avenue (Corner Grand and Myrtle) Brooklyn, New York for an interview.

EXCELLENT opportunity for one checker and one layout draftsman familiar with aviation engine work, with a new but well organized and financed aviation engine manufacturer in the Middle West. Address communications to P-322, Aviation, 520 No. Michigan Ave., Chicago, Ill.

WE HAVE two openings for thoroughly competent stress analysis men, who can do detail, as well as general analysis work, excellent opportunity to men of ability. P-319, Aviation, 520 No. Michigan Ave., Chicago, Ill.

POSITIONS WANTED

AERONAUTICAL engineer of 13 years' experience in aircraft design and research desires position with a new organization. Age 33 years, graduate of M.I.T., experienced on many types of large and small aircraft, military and commercial design. Very competent in aero dynamics. PW-309, Aviation, Tenth Ave. at 36th St., New York.

ATTORNEY-ENGINEER, war pilot, long in patent-law firm, desires connection with aircraft corporation or law firm where his aforementioned background will prove mutually advantageous. R. C. Rasche, 165 Broadway, New York City.

COMMERCIAL pilot, age 26, several years' mechanical experienc, Curtiss graduate, reliable. Fly for living expenses. Aerne, 169 States Ave., Atlantic City, N. J.

CURTISS graduate, 18, 53 hours solo; will fly anywhere, anytime; unlicensed. William Sinclair, Montpelier, Ind.

LICENSED airplane and engine mechanic, an excellent welder, prefer position with distributor or small factory in East. Must be year-round. Best references. PW-320, Aviation, Tenth Ave. at 36th St., New York.

LICENSED ground instructor, transport pilot, college education, army trained, experience as school manager, desires connection with responsible firm. Now employed. PW-324, Aviation, 520 No. Michigan Ave., Chicago, Ill.

LICENSED transport pilot, college educated, army trained 1926-27, desires affiliation with a firm operating in South or Central America. Now employed. PW-323, Aviation, 520 No. Michigan Ave., Chicago, Ill.

LICENSED airplane and engine mechanic, familiar with field and shop overhaul; experienced as instructor, desires position. Have 150 hours flying. Will consider time as part pay. References as to character and ability on request. Thomas Miller, 719 West Ash, Blytheville, Ark.

TRANSPORT pilot; thirteen years flying all kinds, plenty hours, also executive and sales experience. Thirty-two years old, married; now available for either flying or executive job. PW-321, Aviation, 520 No. Michigan Ave., Chicago, Ill.

TRANSPORT pilot, four and one half years' experience open ships. 1,000 hours, good references. Also airplane and engine mechanic's license and F. A. I. Understand design and drafting. Single, sober and steady, can go anywhere. Now own J-5 Waco. Desire permanent responsible position with chance for advancement. David B. Read, 220 Algoma Blvd., Oshkosh, Wis.

POSITIONS WANTED

TRANSPORT pilot available at once; 26, lots of experience, fly any type ship. Capable and dependable, college education. 900 hours. Fred Angstadt, 101 Windsor St., Reading, Pa.

YOUNG man, 35 years old, wants position in aviation field. Have had 12 years' experience as automobile mechanic, but will do anything to help get mechanic's license. Kenneth Bristol, Belchertown, Mass.

SALESMEN WANTED

Fortune in Airplane Sales

Under this plan a salesman should sell at least one Eaglerock a month—a net monthly income for him of from $1,000 to $1,500. Our two weeks free sales training course makes you ready to get the money. We equip salesmen who qualify with a free demonstrator Eaglerock. You can offer buyers an easy plan of time purchase. Write for details. Alexander Aircraft Co., Dept. 11, Colorado Springs, Colo.

PATENTS

Unpatented Ideas Can Be Sold

I tell you how and help you make the sale. Free particulars. (Copyrighted.) Write W. T. Greene, 923 Barrister Bldg., Washington, D. C.

BUSINESS OPPORTUNITY

Airport For Sale or Rent

Completely equipped in every respect. 80 acres, all steel hangar, 60 ft. x 100 ft. Beacon flood lights, etc. A going business. Wonderful location on main highway in city limits of town of 8,000. This property obtained by present owner through foreclosure sale. Will sell or rent cheap. Guy E. Blodgett, Marshfield, Wis.

MISCELLANEOUS

ATTENTION Aviators: Valve guides installed on OX cylinders, $1.50 per guide: removable valve seats installed, $1.00; descriptive literature upon request; all work guaranteed. Illinois Flying Co. New location, 4 West 4th St., Sterling, Ill.

REBUILD your OX5 with removable graphite guides, inserted seats and oversize valve action pins. OX5 and Hisso parts. Write for circular. Heckman Machine Works, 4026 West Lake Street, Chicago, Illinois.

Wing Curves Made to Order

Of plywood or aluminum, or in blueprint form, $5. Guaranteed accuracy. Prompt service. A. Sousa, Pompton Lakes, N. J.

The Searchlight Advertising in This Paper

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price or an expert employee.

The Best Proof

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable *demand* for such machinery or services, by its readers, the market-place which these advertisements represent could not exist for any length of time.

Are *you* using the Searchlight Section?

TECHNICAL SERVICE AGENCY, Inc.
217 Broadway, New York City
Specialists in Technical Personnel
CHEMICAL ELECTRICAL CIVIL
MECHANICAL AVIATION

Aviation—Employment Available
now in Milwaukee for men who desire to earn while learning aviation. Training is in our shops, classrooms and on the airport. No experience necessary. Write for information without obligation.
AERO CORPORATION OF AMERICA
Employment Department AV.
63 Second St., Milwaukee, Wis.

AVIATION Needs Trained Men
Aeronautical Engineering
Drafting Airplane Construction Rigging
Airplane and Engine Mechanics
Flying
As Outlined by Dept. of Commerce
Any of these courses will qualify you for one of the positions in aviation industry.
Free Employment Service
While Training and After Graduation.
Institution of Aeronautics
1780 Broadway at 57th st., New York, N.Y.

A Real Aviation Opportunity

If you are interested in aviation from the aircraft manufacturing standpoint, a wonderful opportunity is presented. The designer of a Government approved four place cabin type monoplane desires to sell outright to parties who will place it in production design and data together with Government approved stress analyses.

This is a wonderful opportunity for any person or a group of persons desiring to engage in the manufacture of airplanes. Designed for 150 to 225 horsepower, this airplane promises to be an outstanding craft in its class. It will have eye value and performance second to none.

Address inquiries to:
B.O.-295, Aviation
520 No. Michigan Ave., Chicago, Ill.

ALPHABETICAL INDEX TO ADVERTISEMENTS

Name	Page
Alliance Aircraft Corp.	1
America La France & Foamite Corp.	29
America Tar Products Co.	15
Anchor Post Fence Co.	34
Austin Co., The	39
Axelson Aircraft Engine Co.	3
Barnes Co., Wallace	34
Bendix Brake Co.	39
Berliner-Joyce Aircraft Corp.	35
Bethlehem Steel Co.	28
Bohn Aluminum & Brass Corp.	Inside Front Cover
Brock & Welmouth, Inc.	13
Brownback Motor Laboratories, Inc.	39
Budd Wheel Co.	38
Champion Spark Plug Co.	33
Cheney & Son, S.	18
Cleveland Pneumatic Tool Co.	4
Continental Motors Corp.	Inside Back Cover
Crouse-Hinds Co.	11
Cunningham-Hall Aircraft Corp.	38
Curtiss Wright Flying Service	22
Detroit Aircraft Corp. (Div. of Lockheed Aircraft Corp.)	12
Detroit Board of Commerce	33
Eagle Ottawa Leather Co.	38
Edo Aircraft Corp.	38
Endicott Forging & Mfg. Co., Inc.	37
Fairchild Aviation Corp. & subsidiaries	37
Fokker Aircraft Corp. of America	8
Glidden Co., The	30
Great Lakes Aircraft Corp.	10
Hartzell Propeller Co.	37
Independent Pneumatic Tool Co.	32
International Derrick & Equipment Co.	27
International Nickle Co.	14
Jaeger Watch Co., Inc.	39
LeBlond Aircraft Engine Corp., The	38
Lee Mercantile Co., H. D.	31
McGraw-Hill Book Co.	31
Metallurgical Laboratories, Inc.	21
Moto Meter Co., The	38
Nicholas-Beazley Airplane Co. Inc.	37
Peck, Stow & Wilcox Co., The	37
Pennzoil Co.	37
Pitcairn Aviation, Inc.	36
Pratt & Whitney Aircraft Co.	26
Robertson Aircraft Corp. (Universal Div.)	36
Scintilla Magneto Corp.	17
Searchlight	40-41-42-43-44-45
Service Steel Co.	36
Sikorsky Aviation Corp.	24 & 25
Sky Specialties	2
Star Aircraft Co.	36
Streloff-Naughton Corp.	36
Summerill Tubing Co.	20
Thomas & Armstrong	35
Timm Airplane Corp.	35
Titanine, Inc.	35
Union Carbide & Carbon Corp.	7
United Aircraft & Trans. Corp.	
(Pratt & Whitney Aircraft Co.)	26
(Sikorsky Aviation Corp.)	24 & 25
U. S. Air Compressor Co.	32
U. S. Electric Tool Co.	9
U. S. Hammered Piston Ring Co.	35
United States Rubber Co.	16
Veit, Paul	30
Vought Corp., Chance	6
Waco Aircraft Co.	23
Westinghouse Electric & Mfg. Co.	5 & 19
White Dental Mfg. Co., S. S., The	35
Wright Aeronautical Corp.	Back Cover

SEARCHLIGHT

Classified Advertising

BUSINESS OPPORTUNITIES	45
EMPLOYMENT SERVICE	45
POSITIONS VACANT	45
POSITIONS WANTED	45
SALESMEN WANTED	45
TECHNICAL SERVICE	45
MISCELLANEOUS	45
EQUIPMENT WANTED	45
REPRESENTATIVE WANTED	45
SCHOOLS MISCELLANEOUS	45
USED AND SURPLUS EQUIPMENT	43-44
WANTED MISCELLANEOUS	45

AIRCRAFT SERVICE DIRECTORY

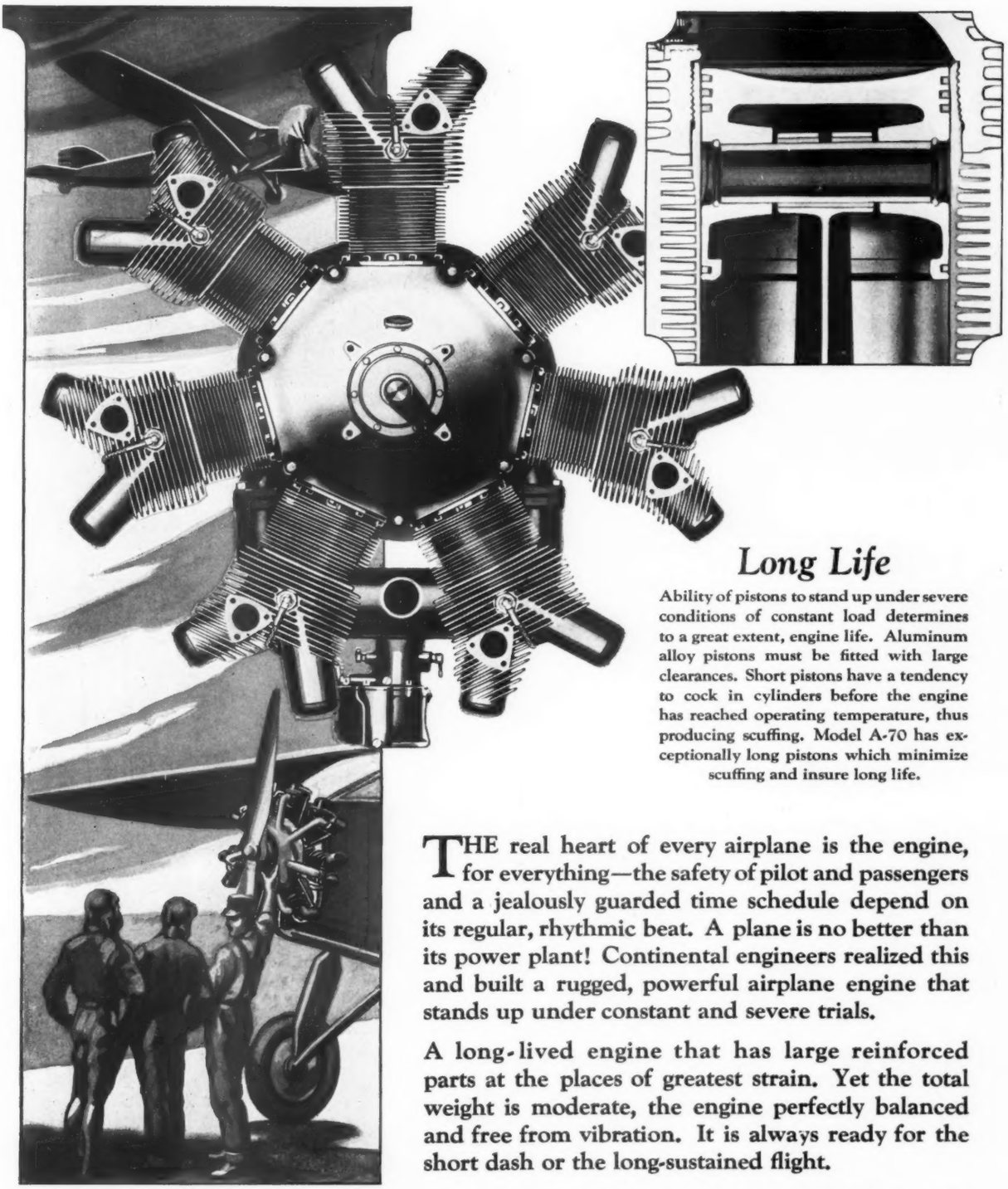
Airport Hangar Co.	42
Allen & Drew, Inc.	42
Aviation Protection, Inc.	42
Beck Distributing Corp.	42
Boston Auto Gage Co.	42
Burgess Norton Mfg. Co.	42
Cox & Son, John S.	42
Frisbie Aircraft Products	42
Gardner Propeller Wks.	42
Haskelite Mfg. Co.	42
Iowa-Illinois Airways, Inc.	42
New York University	42
Ostergard Aircraft Wks.	42
Paragon Engineers, Inc.	42
Pioneer Instrument Co.	42
Phoenix Aircraft Products Co.	42
Rieker Instrument Co.	42
Strauss & Buegeleisen	42
Weis, Inc., Geo. A.	42

PROFESSIONAL SERVICES

Aero-Ken	41
Aircraft Engineers Inc.	41
Showalter Associates	41
Staeker, Edw. A.	41
Tubular Air-Craft Corp. Lab.	41

WHERE TO FLY

Pages	40-41



Long Life

Ability of pistons to stand up under severe conditions of constant load determines to a great extent, engine life. Aluminum alloy pistons must be fitted with large clearances. Short pistons have a tendency to cock in cylinders before the engine has reached operating temperature, thus producing scuffing. Model A-70 has exceptionally long pistons which minimize scuffing and insure long life.

THE real heart of every airplane is the engine, for everything—the safety of pilot and passengers and a jealously guarded time schedule depend on its regular, rhythmic beat. A plane is no better than its power plant! Continental engineers realized this and built a rugged, powerful airplane engine that stands up under constant and severe trials.

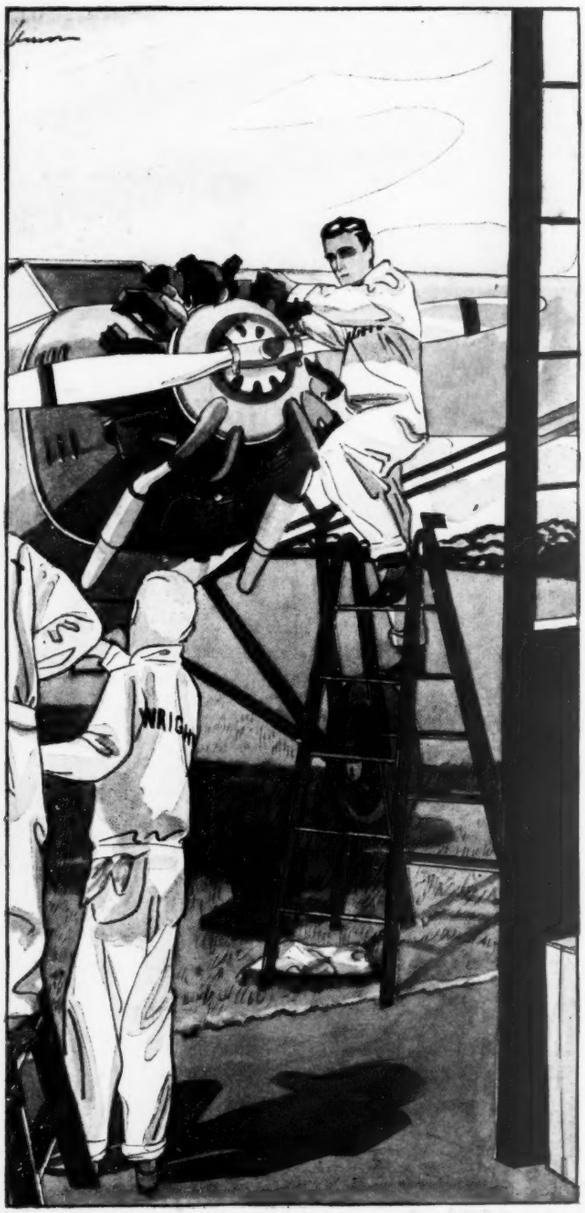
A long-lived engine that has large reinforced parts at the places of greatest strain. Yet the total weight is moderate, the engine perfectly balanced and free from vibration. It is always ready for the short dash or the long-sustained flight.

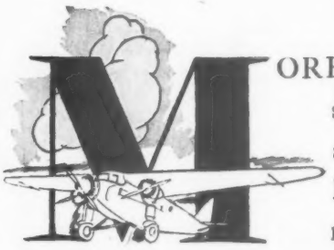
CONTINENTAL AIRCRAFT ENGINE CO.
Office and Factory: Detroit, Michigan

CONTINENTAL MOTORS · Power that has carried a Nation · AMERICA'S STANDARD

Continental Engines

"PILOT MY OWN PLANE? WELL—AND WHY NOT?"





MORE than eight thousand men and women are licensed to fly. But nearly half a million people buy and read the magazines such as this, devoted to the air!

To the four hundred and ninety-two thousand people who are not yet pilots, Wright, here and now makes the suggestion that they start!

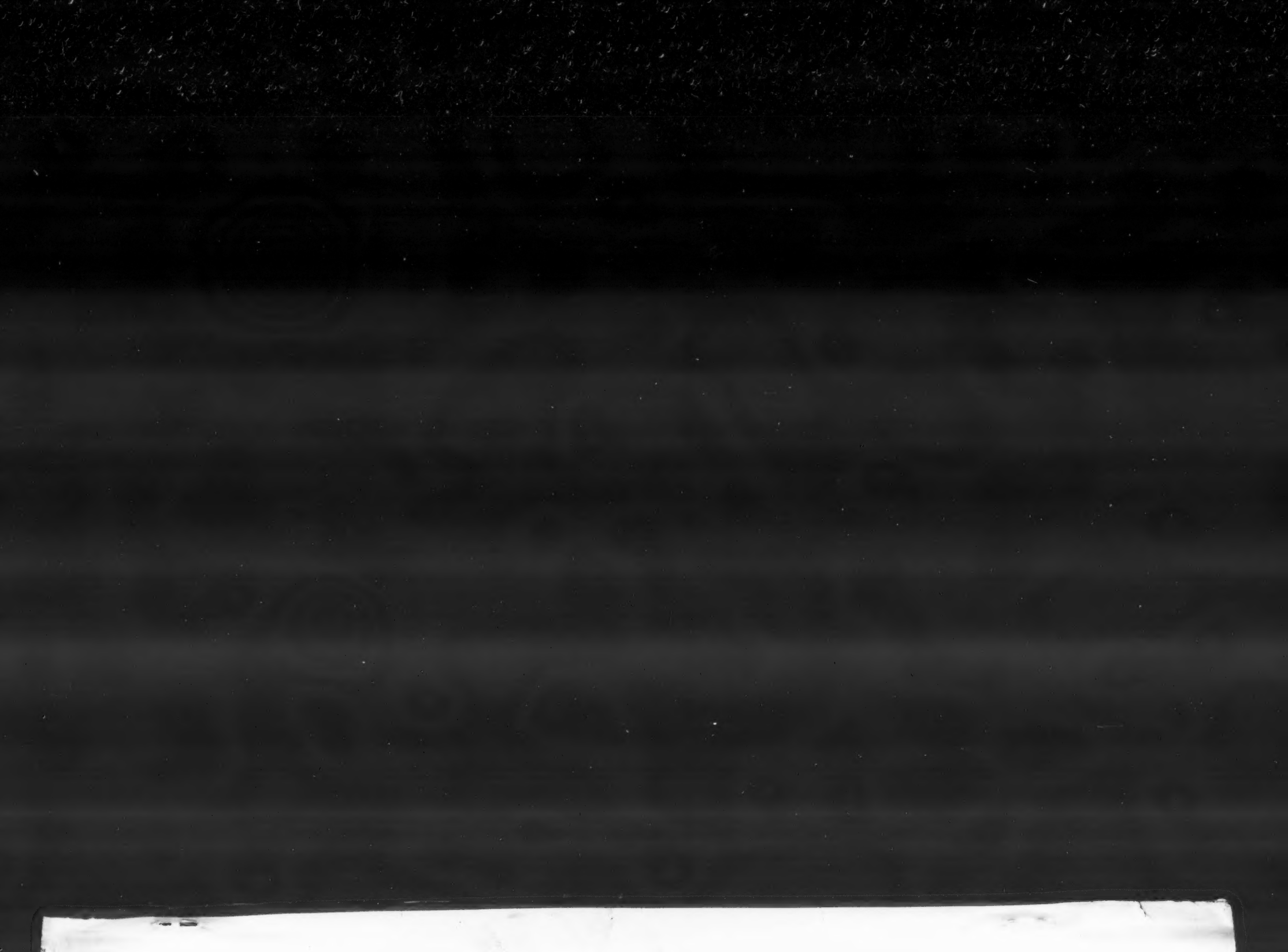
Planes of today are capable. Wright "Whirlwinds" and Wright "Cyclones" are strong, dependable engines; pilots are skillful; landing fields daily increase in number and are constantly bettered in quality; while ground service equal to the best garages is flourishing at all good airports.

And most important of all, costs are coming down—(and never forget that it has been cost, not danger, that has limited public participation in airplane activities).

So to our non-flying readers of aviation publications, Wright suggests that they join the First Flight Club now—with the firm conviction that a few years hence will see them piloting a plane of their own!

Off the ground and go!

WRIGHT

AERONAUTICAL CORPORATION

PATERSON, NEW JERSEY